PR95

Operator's Manual

CE

CMW®

Issue 1.0

053-1102

Overview

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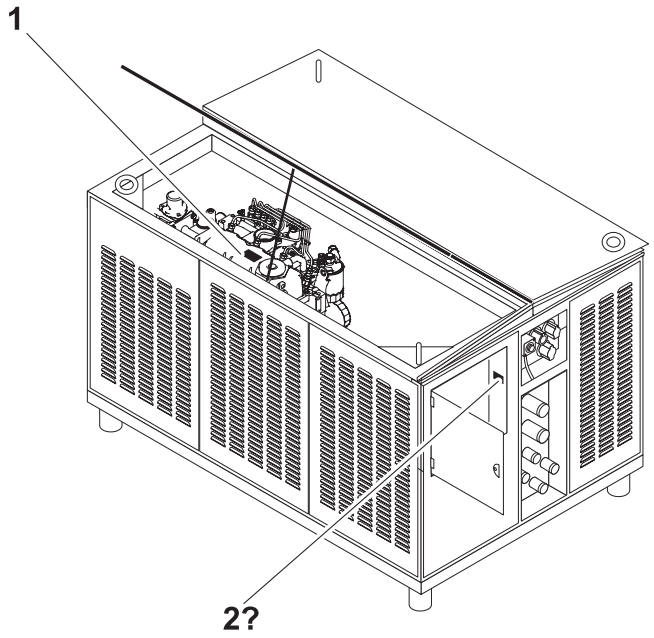
Serial Number Location

Record serial numbers and date of purchase in spaces provided. Power unit (2) and engine serial numbers (1) are located as shown.



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Date of manufacture	
Date of purchase	
Power unit serial number	
Engine serial number	

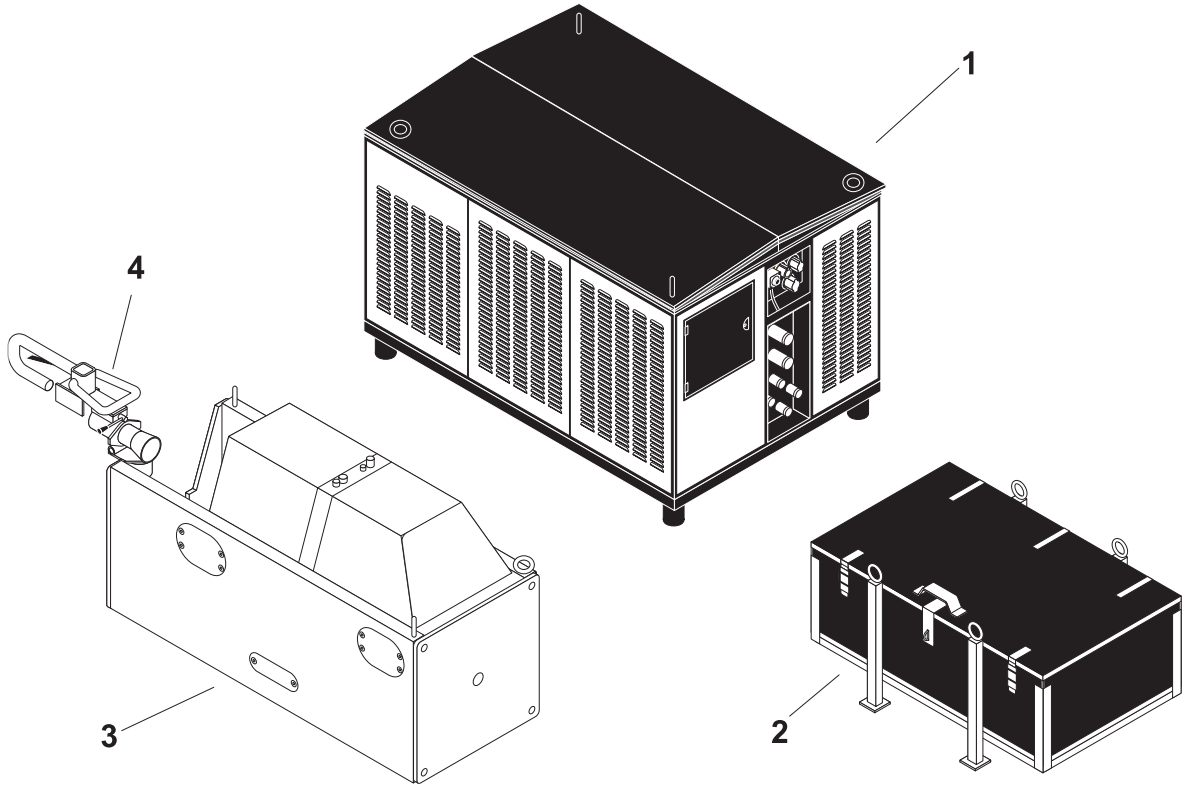
Intended Use

Ditch Witch pipe bursters are intended for the replacement of buried pipes and conduits. The PR95 produces 187,400 lb (88 t) of pullback force. A power unit provides hydraulic power to run the pipe burster.

The unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Provisions may be required to operate in extreme temperatures. Contact your Ditch Witch dealer. Use in any other way is considered contrary to the intended use.

Ditch Witch pipe bursters and power units should be operated, serviced, and repaired only by persons familiar with their particular characteristics and acquainted with the relevant safety procedures.

Unit Components



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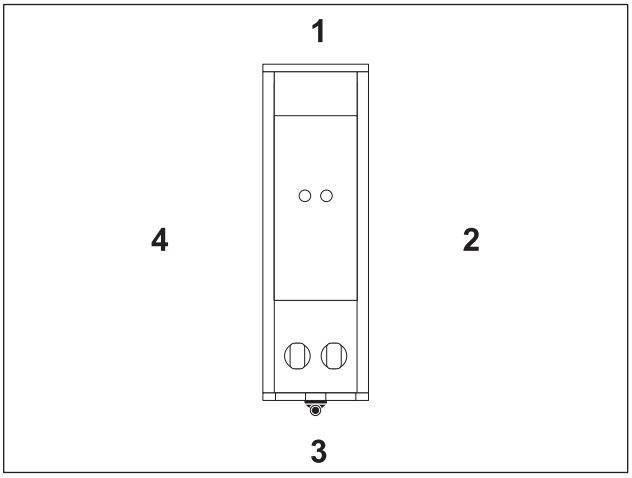
1. Power unit
2. Accessory kit
3. Bursting unit
4. Rod makeup device

Operator Orientation

IMPORTANT: Top view of unit is shown.

1. Front of unit
2. Right side of unit
3. Rear of unit
4. Left side of unit



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About This Manual

This manual contains information for the proper use of this machine. See **Operation Overview** for basic operating procedures. Cross references such as "See page 50" will direct you to detailed procedures.

Bulleted Lists

Bulleted lists provide helpful or important information or contain procedures that do not have to be performed in a specific order.

Numbered Lists

Numbered lists contain illustration callouts or list steps that must be performed in order.

"Continued" Indicators

indicates that a procedure is continued on the next page.

Foreword

This manual is an important part of your equipment. It provides safety information and operation instructions to help you use and maintain your Ditch Witch equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference. If you sell your equipment, be sure to give this manual to the new owner.

If you need a replacement copy, contact your Ditch Witch dealer. If you need assistance in locating a dealer, visit our website at **www.ditchwitch.com** or write to the following address:

The Charles Machine Works, Inc.
Attn: Marketing Department
PO Box 66
Perry, OK 73077-0066
USA

The descriptions and specifications in this manual are subject to change without notice. The Charles Machine Works, Inc. reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on Ditch Witch equipment, see your Ditch Witch dealer.

Thank you for buying and using Ditch Witch equipment.

PR95
Operator's Manual

Issue number 1.0/OM-9/06
Part number 053-1102

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Safety

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Guidelines

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Contact One-Call (888-258-0808) and any utility companies which do not subscribe to One-Call. Have all underground pipes and cables located and marked before operating equipment. If you damage a utility, contact utility company.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- Wear personal protective equipment.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety videos are available from your Ditch Witch dealer.
- Replace missing or damaged safety shields and safety signs.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas is present.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.

Safety Alert Classifications

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. YOUR SAFETY IS AT STAKE.

Watch for the three safety alert levels: **DANGER**, **WARNING** and **CAUTION**. Learn what each level means.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

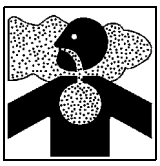
Watch for two other words: **NOTICE** and **IMPORTANT**.

NOTICE can keep you from doing something that might damage the machine or someone's property. It can also alert you against unsafe practices.

IMPORTANT can help you do a better job or make your job easier in some way.

Safety Alerts

DANGER Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.



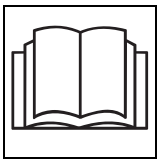
DANGER Deadly gases. Lack of oxygen or presence of gas will cause sickness or death. Provide ventilation.

DANGER Moving tools will kill or injure. Never use wrenches or tools on moving rods and burster unit components when unit is operating.

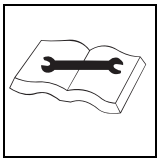
WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

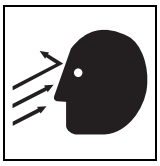
WARNING Moving parts on unit could cut off hand or foot. Stay away.



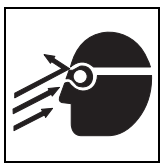
WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.



WARNING Improper control function could cause death or serious injury. If control does not work as described in instructions, stop machine and have it serviced.



WARNING Looking into fiber optic cable could result in permanent vision damage. Do not look into ends of fiber optic or unidentified cable.



WARNING Pressurized fluid or air could pierce skin and cause injury or death. Stay away.

WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark.

WARNING Moving traffic - hazardous situation. Death or serious injury could result. Avoid moving vehicles, wear high visibility clothing, post appropriate warning signs.

WARNING Hot pressurized cooling system fluid could cause serious burns. Allow to cool before servicing.

⚠ CAUTION Flying objects may cause injury. Wear hard hat and safety glasses.

⚠ CAUTION Hot parts may cause burns. Do not touch until cool.

⚠ CAUTION Exposure to high noise levels may cause hearing loss. Wear hearing protection.

⚠ CAUTION Fall possible. Slips or trips may result in injury. Keep area clean.

⚠ CAUTION Battery acid may cause burns. Avoid contact.

⚠ CAUTION Improper handling or use of chemicals may result in illness, injury, or equipment damage. Follow instructions on labels and in material safety data sheets (MSDS).

Emergency Procedures

Before operating any equipment, review emergency procedures and check that all safety precautions have been taken.

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button.

Electric Strike Description

When working near electric cables, remember the following:

- Electricity follows all paths to ground, not just path of least resistance.
- Pipes, hoses, and cables will conduct electricity back to all equipment.
- Low voltage current can injure or kill. Almost one-third of work-related electrocutions result from contact with less than 440 volts.

Most electric strikes are not noticeable, but indications of a strike include:

- power outage
- smoke
- explosion
- popping noises
- arcing electricity

If any of these occur, assume an electric strike has occurred.

If an Electric Line is Damaged

If you suspect an electric line has been damaged and you are **in pit**, DO NOT MOVE. Remain in pit and take the following actions. The order and degree of action will depend upon the situation.

- Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
- Contact utility company to shut off power.
- Do not leave pit until given permission by utility company.

If you suspect an electric line has been damaged and you are **out of pit**, DO NOT TOUCH ANYTHING IN PIT. Take the following actions. The order and degree of action will depend upon the situation.

- LEAVE AREA. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other. For more information, contact your Ditch Witch dealer.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

If you suspect an electric line has been damaged and you are **on other piece of equipment**, DO NOT MOVE. Remain on truck or trailer and take the following actions. The order and degree of action will depend on the situation.

- Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
- Contact utility company to shut off power.
- Do not return to area or allow anyone into area until given permission by utility company.

If you suspect an electric line has been damaged and you are **off other piece of equipment**, DO NOT TOUCH EQUIPMENT. Take the following actions. The order and degree of action will depend on the situation.

- LEAVE AREA.
- Contact utility company to shut off power.
- Do not return to area or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged

If you suspect a gas line has been damaged, take the following actions. The order and degree of action will depend on the situation.

- Immediately shut off engine(s), if this can be done safely and quickly.
- Remove any ignition source(s), if this can be done safely and quickly.
- Warn others that a gas line has been cut and that they should leave the area.
- Leave jobsite as quickly as possible.
- Immediately call your local emergency phone number and utility company.
- If jobsite is along street, stop traffic from driving near jobsite.
- Do not return to jobsite until given permission by emergency personnel and utility company.

If a Fiber Optic Cable is Damaged

Do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur.

If Machine Catches on Fire

Perform emergency shutdown procedure and then take the following actions. The order and degree of action will depend on the situation.

- Immediately move battery disconnect switch (if equipped) to disconnect position.
- If fire is small and fire extinguisher is available, attempt to extinguish fire.
- If fire cannot be extinguished, leave area as quickly as possible and contact emergency personnel.

Controls

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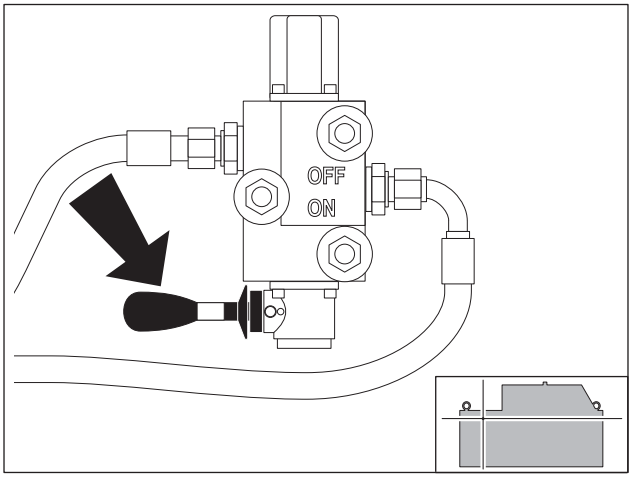
Bursting Unit



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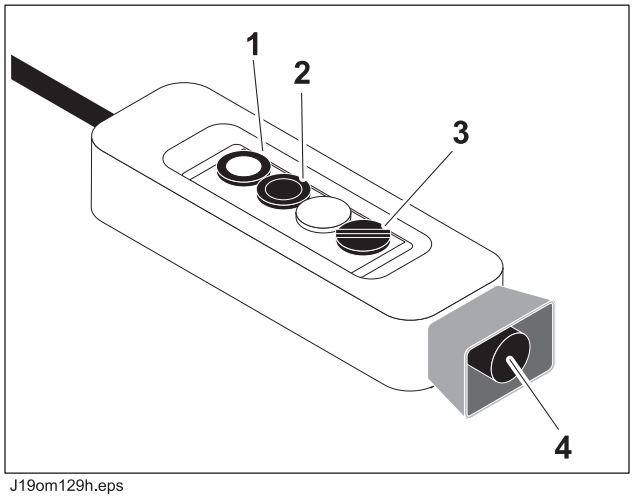
Front jaw control

Item	Description	Notes
Front jaw control	To enable automatic front jaw operation, push. To disable, pull.	**IMPORTANT:** Use in pull mode. • Enable when bursting pipe. • Disable when pushing.

Remote Controller



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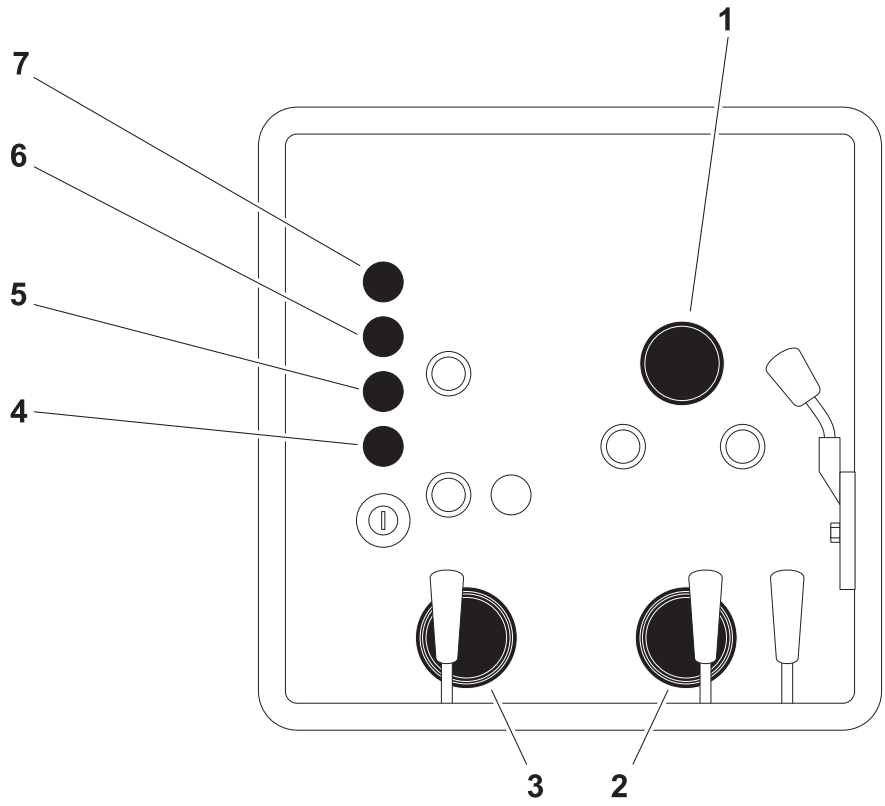
1. Work button (white)
2. Return button (black)
3. Mode switch
4. Emergency stop switch

Item	Description	Notes
1. Work button (white)	With mode selector in **push** mode, push and hold to push rod into existing pipe. With mode selector in **pull** mode, push and hold to pull new pipe.	
2. Return button (black)	With mode selector in **push** mode, push and hold to return carriage to back of unit. Jaws close when button is released. With mode selector in **pull** mode, push and hold to return carriage to front of unit. Jaws close when button is released.	
3. Mode selector	To enter pull mode, move left. To enter push mode, move right.	Decal is marked "reverse."

Item	Description	Notes
4. Emergency stop switch	Push to stop power unit engine.	**IMPORTANT:** All emergency stops must be connected and disengaged for unit to start.

Power Unit

Gauges and Indicators



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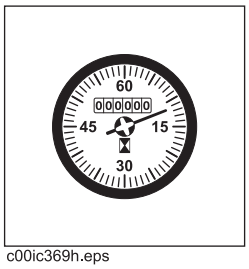
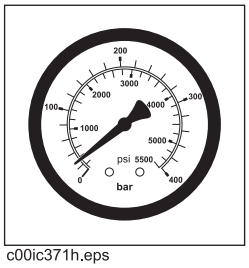
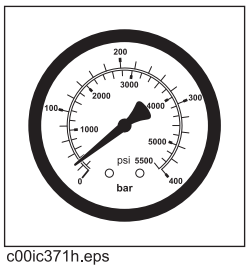
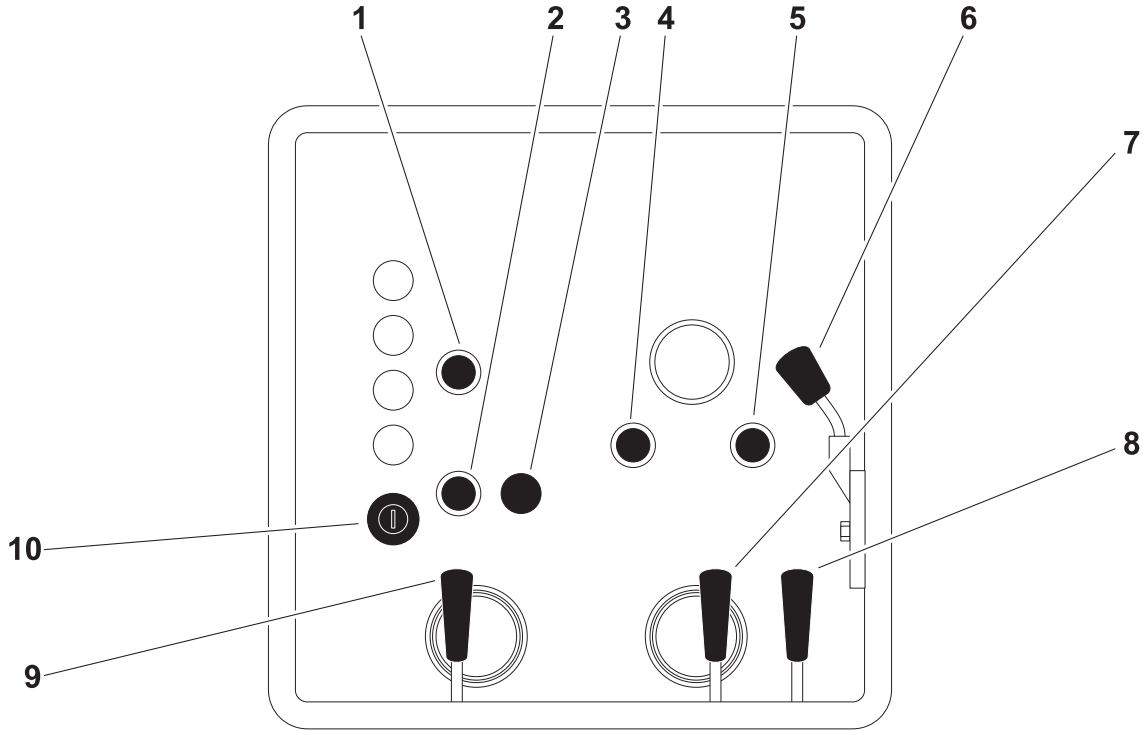
1. Hourmeter
2. Main cylinders pressure gauge
3. Jaw system pressure gauge
4. Battery charge indicator
5. Engine preheater indicator
6. Engine oil pressure indicator
7. Coolant temperature indicator

Item	Description	Notes
1. Hourmeter  c00ic369h.eps	Displays engine operating time.	Gauge is marked "hours." Use these times to schedule service.
2. Main cylinders pressure gauge  c00ic371h.eps	Displays hydraulic pressure at main cylinders.	Gauge is marked "pump pressure main." Full load reading should be 3600 psi (248 bar).
3. Jaw system pressure gauge  c00ic371h.eps	Displays hydraulic pressure in jaw system.	Gauge is marked "pump pressure jaws." Full load reading should be 3600 psi (248 bar).
4. Battery charge indicator	Lights when battery is not charging.	Indicator is marked "charge."
5. Engine preheater indicator	Lights when glow plugs are on.	Indicator is marked "glow." **IMPORTANT:** Start engine after light goes off.
6. Engine oil pressure indicator	Lights when engine oil pressure is low.	Indicator is marked "oil pressure."
7. Coolant temperature indicator	Lights if cooling system fluid overheats.	Indicator is marked "water temp." • Turn off engine and let cool. • Check cooling system fluid level.

Controls



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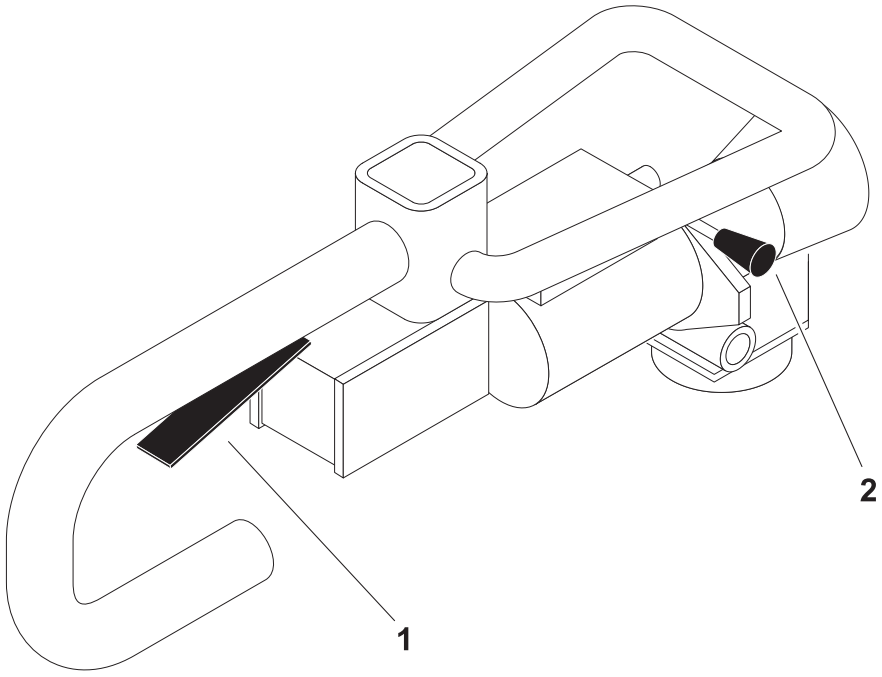
1. Bursting unit engage control
2. Bursting unit standby control
3. Emergency stop switch
4. Rod makeup engage control
5. Rod makeup standby control
6. Throttle
7. Bursting unit manual control
8. Rod makeup manual control
9. Rear jaw manual control
10. Ignition switch

Item	Description	Notes
1. Bursting unit engage control	To turn on hydraulic flow to bursting unit, press.	
2. Bursting unit standby control	To stop hydraulic flow to bursting unit, press.	
3. Emergency stop switch	To turn off power unit engine, press.	**IMPORTANT:** All emergency stops must be connected and disengaged for unit to start.

Item	Description	Notes
4. Rod makeup engage control	To turn on hydraulic flow to rod makeup device, press.	
5. Rod makeup standby control	To stop hydraulic flow to rod makeup device, press.	
6. Throttle	To increase engine speed, push up. To decrease engine speed, pull down.	
7. Bursting unit manual control	**In push mode:** To return carriage to back of unit, pull. To push rod into pipe, push. **In pull mode:** To pull new pipe through pipe, pull. To return carriage to front of unit, push.	Use in sequence with rear jaw manual control to push and pull rods from power unit control station. **Push sequence:** • push jaw manual control • push bursting unit manual control • pull jaw control • pull bursting unit control **Pull sequence:** • push bursting unit manual control • push jaw manual control • pull bursting unit control • pull jaw control
8. Rod makeup manual control	To engage hydraulics to rod makeup device, pull and hold. To disengage hydraulics, release.	
9. Rear jaw manual control	**In push mode:** To close jaws, pull. To open jaws, push. **In pull mode:** To close jaws, push. To open jaws, pull.	Use in sequence with bursting unit manual control to push and pull rods. See "Bursting unit manual control" for sequence.

Item	Description	Notes
10. Ignition switch	To start engine, insert key and turn clockwise. To stop engine, turn key counterclockwise.	**IMPORTANT:** If unit won't start, ensure all emergency stop switches are disengaged.

Rod Makeup Device



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1. Engage switch
2. Rotation speed/direction control

Item	Description	Notes
1. Engage switch	Press switch to engage rod makeup device.	**IMPORTANT:** Jaws must be closed before unthreading rod in rod device to prevent unthreading downhole.
2. Rotation speed/ direction control	To thread rods faster, move handle to right. To thread/unthread rods slower, move handle toward center. To unthread rods faster, move handle to left.	**IMPORTANT:** Direction is determined from standing behind engage handle.

Prepare

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Gather Information

A successful job begins before the burst. The first step in planning is reviewing information already available about the job and jobsite.

Review Job Plan

Review blueprints or other plans and make sure you have taken enlargement during pullback into account. Check for information about existing or planned structures, elevations, or proposed work that may be taking place at the same time.

Notify One-Call Services

Call area One-Call or similar services and have existing lines located and marked. Call any utilities in your area that do not subscribe to One-Call.

Examine Pullback Material

Ask for a sample of the material you will be pulling back. Check its weight and stiffness. Contact the manufacturer for bend radius information. Check that you have appropriate pullback devices.

Arrange for Traffic Control

If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

Plan for Emergency Services

Have the telephone numbers for local emergency and medical facilities on hand. Check that you will have access to a telephone.

Inspect Site

Inspect jobsite before transporting equipment. Check for the following:

Inspect jobsite before transporting equipment. Check for the following:

- changes in elevation such as hills or open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities
  - "buried utility" notices
  - utility facilities without overhead lines
  - gas or water meters
  - junction boxes
  - drop boxes
  - light poles
  - manhole covers
  - sunken ground
- traffic
- access
- soil type and condition
- depths of existing pipes

Identify Hazards

- Identify safety hazards. Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.
- Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of burst path. Verify previously marked line and cable locations.
- Mark location of all buried utilities and obstructions.

WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

NOTICE:

- Wear personal protective equipment including hard hat, safety eye wear, and hearing protection.
- Do not wear jewelry or loose clothing.
- Notify One-Call and companies which do not subscribe to One-Call.
- Comply with all utility notification regulations before digging or bursting.
- Verify location of previously marked underground hazards.
- Mark jobsite clearly and keep spectators away.

Select Exit and Burster Pit Locations

Consider the following when selecting pit locations:

Traffic

Vehicle and pedestrian traffic must be a safe distance from bursting equipment. Allow at least 10' (3 m) buffer zone around equipment.

Space

Check that starting and ending points allow enough space for exit and burster pits.

Check that exit area has enough space for product to be installed.

Check that there is enough space to work.

Access

Consider shade, wind, fumes, and other site features.

Plan Burst Path

Plan the burst path, from entry to end, before job begins. Locate the entire route of the pipe to be replaced to ensure a straight path. Expose all crossing or parallel utilities within 18" (500 mm) of the pipe being burst. Visually verify that bursting head does not damage utility.

Prepare Jobsite

WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

NOTICE:

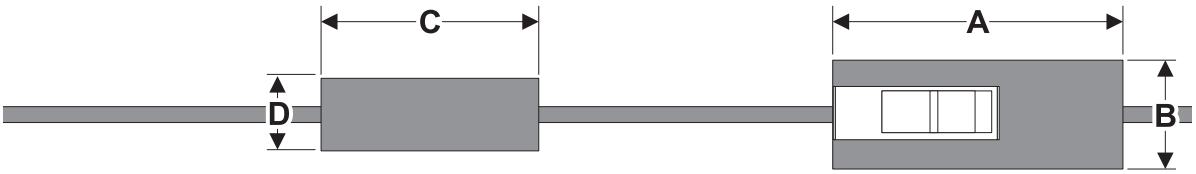
- Cutting high voltage cable can cause electrocution. Expose lines by hand before digging.
- All vegetation near operator's station must be removed. Contact with trees, shrubs, or weeds during electrical strike could result in electrocution.

Mark Burst Path

Mark your planned burst path with flags or paint.

Dig Launch and Burster Pits

Dimensions



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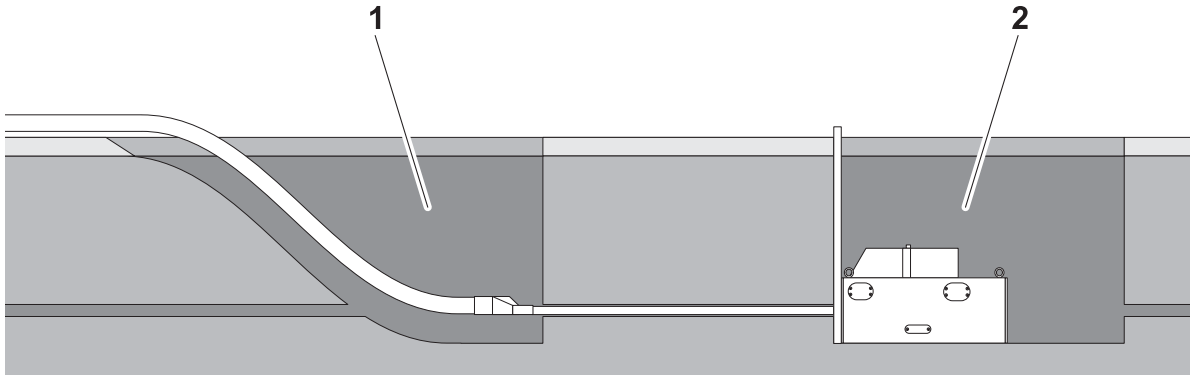
Unit	Burster Pit		Exit Pit *	
	Length (A) **U.S. (metric)**	**Width (B)** **U.S. (metric)**	**Length (C)** **U.S. (metric)**	**Width (D)** **U.S. (metric)**
PR95	12' (3.6 m)	5' (1.5 m)	10' (3 m)	3' (1 m)
* Exit pit dimensions depend on pipe depth and product being installed.				

Requirements



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Exit Pit (1)

- Must be in line with existing pipe.
- Sloped back end aids new pipe entry.

Burster Pit (2)

- Must be in line with existing pipe.
- Must allow burster to be level with existing pipe.

Check Supplies and Prepare Equipment

Check Supplies

- marking flags or paint
- fuel
- keys
- cutting heads, clevis
- barrier cones and tape
- spray lubricant (such as WD-40)
- personal protective equipment, such as hard hat and safety glasses
- notepad and pencil

Prepare Equipment

Fluid Levels

- fuel
- hydraulic fluid
- engine coolant
- battery charge
- engine oil

Condition and Function

- filters (air, oil, hydraulic)
- couplers
- pumps and motors
- hoses and valves

Assemble Accessories

Fire Extinguisher

If required, mount a fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

Transport

Chapter Contents

Lift 40

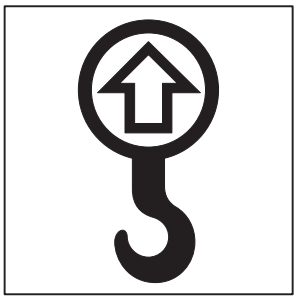
- Points 40
- Procedure 40

Lift

WARNING Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.

Points

Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.



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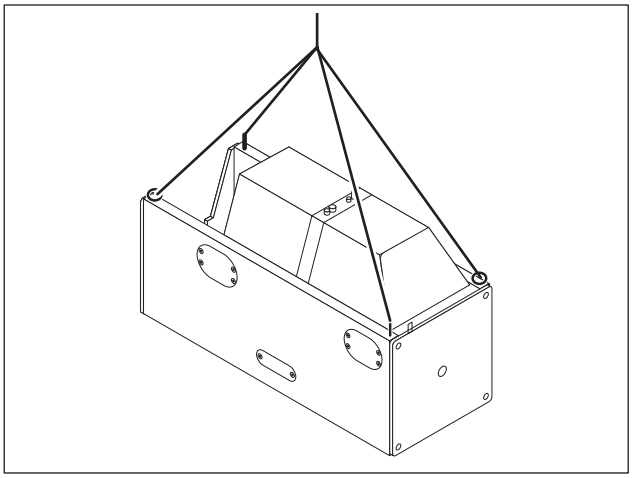
Procedure

Bursting Unit

Use a crane capable of supporting the equipment's size and weight. See “Specifications” on page 85 or measure and weigh equipment before lifting.Use lift points as shown.



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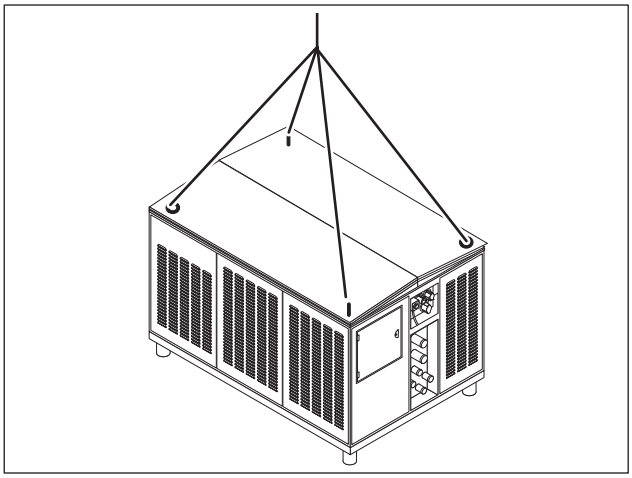
Power Pack

Use a crane capable of supporting the equipment's size and weight. See “Specifications” on page 85 or measure and weigh equipment before lifting. Use lift points as shown.



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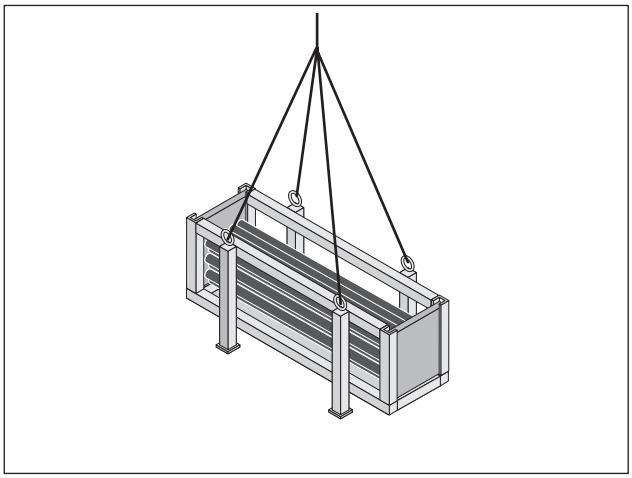
Rod Box

Use a crane capable of supporting the equipment's size and weight.



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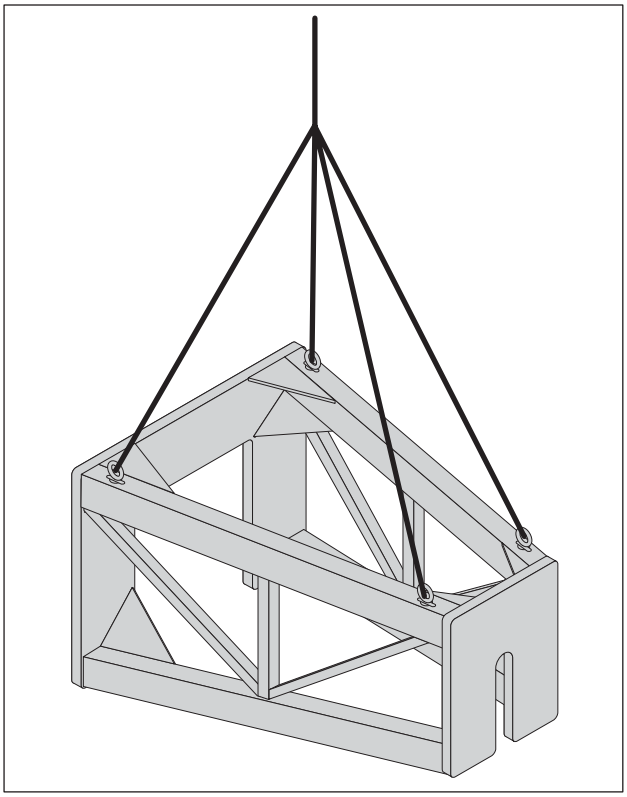
Extension Frame

Use a crane capable of supporting the equipment's size and weight.



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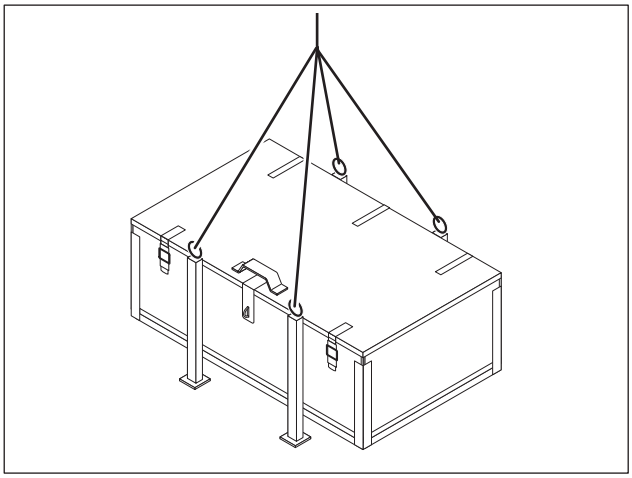
Accessory Kit

Use a crane capable of supporting the equipment's size and weight.



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Burst Pipe

Chapter Contents

Prepare System 44

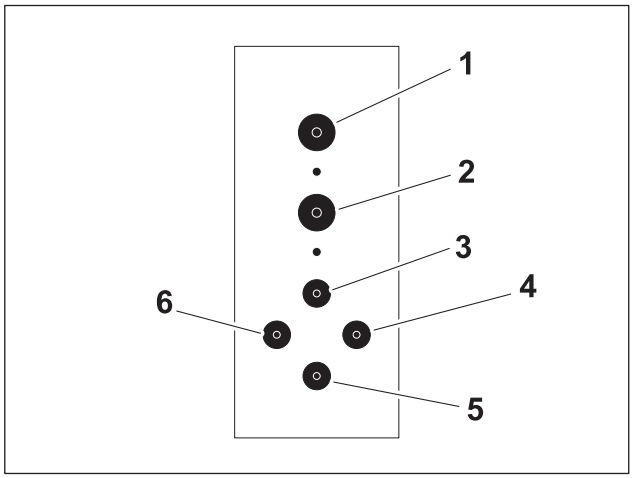
Push Rods 46

Connect 47

Pull Pipe 48

Prepare System

1. Unload bursting unit, power unit and rod boxes next to burster pit.
2. Connect hydraulic hoses to power unit.



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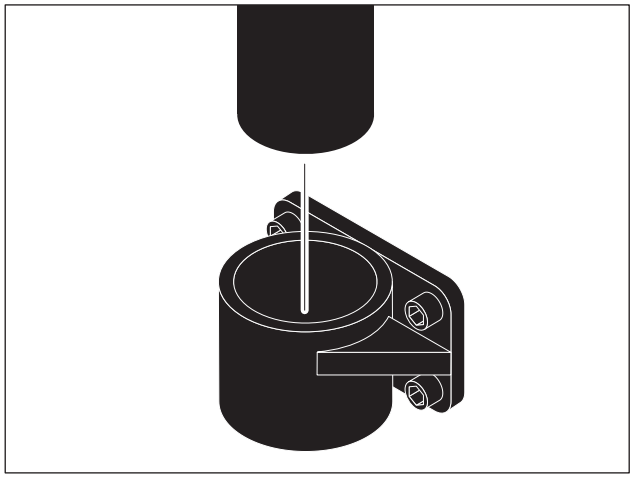
IMPORTANT:

- Ensure connectors are clean before threading hoses onto connectors.
- Each connector is a different size and will only attach to the same-sized connector.
- Connect hose 5 first and work up to hose 1 for easy access.

  - Hoses 1, 2, 3 and 5 are from bursting unit.
  - Hoses 4 and 6 are from rod makeup device.

3. Tighten hoses fully.
4. Lower bursting unit into pit. Use boards to ensure rods will be level with existing pipe.
5. Place end of rod makeup device arm into hole on end of rear of bursting unit.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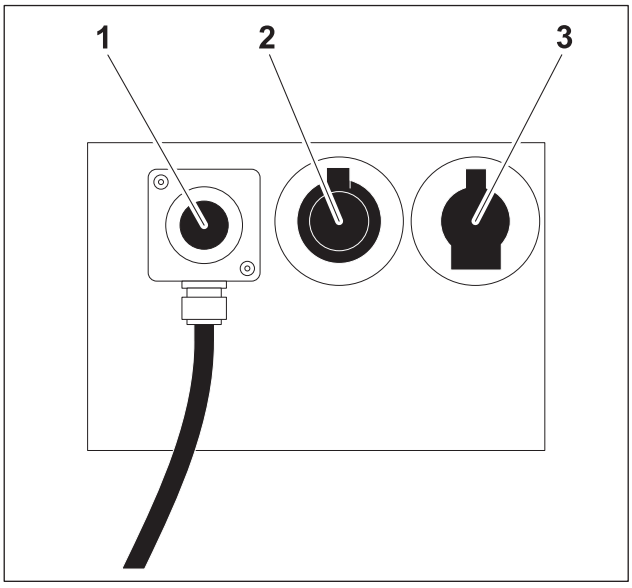
6. Connect electrical cables.
   - Connector 1 is for stationary emergency stop
   - Connector 2 is for remote emergency stop
   - Connector 3 is for remote bursting unit control



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7. Connect ground rod to bursting unit.
8. Drive ground rod into soil at front of pit.

Push Rods

IMPORTANT: If bursting unit or rod makeup device does not work,

- Ensure all emergency stops are connected and disengaged.
- Check all hydraulic and electrical connections.

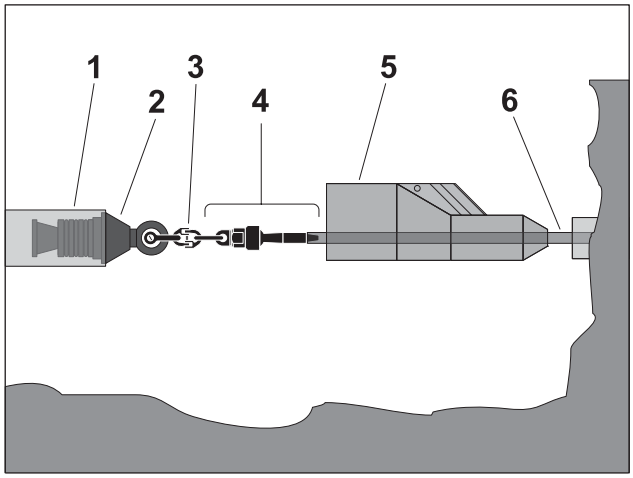
1. Start power unit engine.
2. Assemble pilot rod. See "Pilot Rods" on page 52.
3. Disable brake.
4. Thread 2-3 rods together.

IMPORTANT: Spray lubricant (such as WD-40) on threads of each rod every use.

5. Put bursting unit into push mode and push rod string into existing pipe.
6. Thread next rod onto rod string loosely.
7. Swing rod makeup device into position and place collar onto end of rod.
8. Thread onto pipe loosely.
9. Turn rotation speed/direction control to right.
10. Press engage switch until rods thread together completely.
11. Move rod makeup device clear of rod.
12. Push rod into pipe.
13. Continue threading rods together and pushing into pipe until pilot assembly enters exit pit.

Connect

1. Install towing head (2) onto end of new pipe (1).
2. Remove pilot rod assembly.
3. Install bursting head (5) over rod (6) and slide forward until threads are visible.
4. Thread stop rod assembly (4) on end of rod string.
5. Connect stop rod assembly to towing head with a shackle (3).



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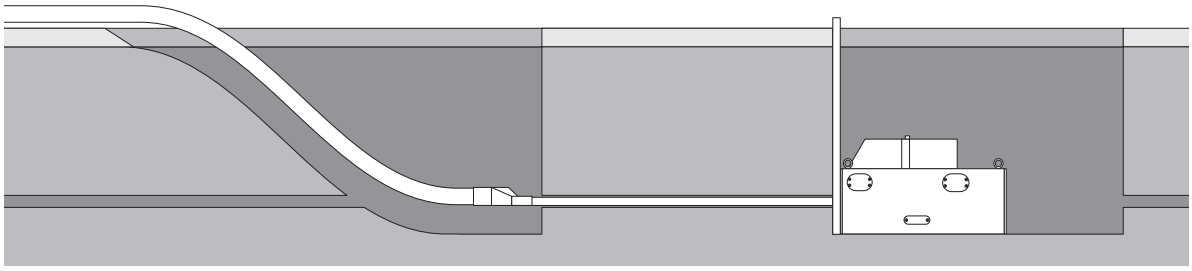
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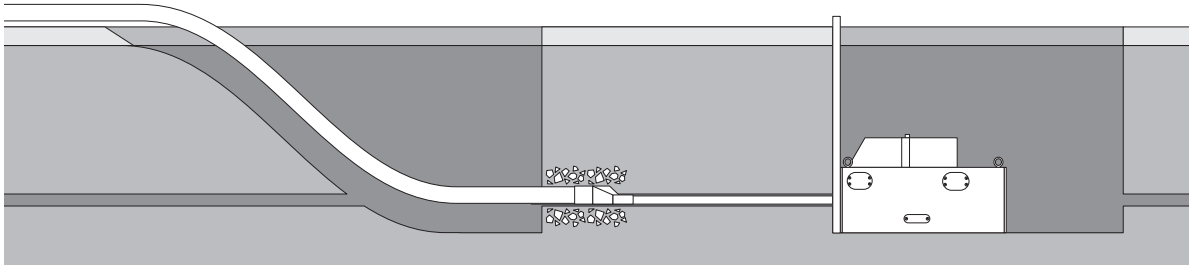
Pull Pipe



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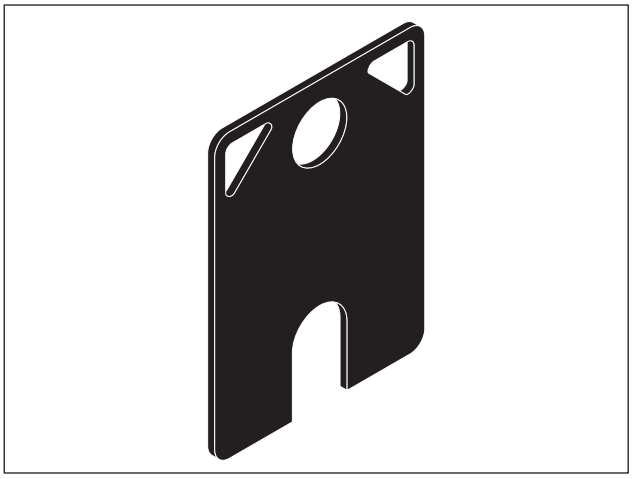
1. Push bursting unit away from pit wall slightly.
2. Slide pulling brace (shown) into position. Ensure brace is flush with pit wall.
3. Put bursting unit into pull mode.
4. Enable brake.
5. Pull back rod.
6. Unthread and place in rod box.
7. Continue pulling back rods until towing assembly reaches burster pit.



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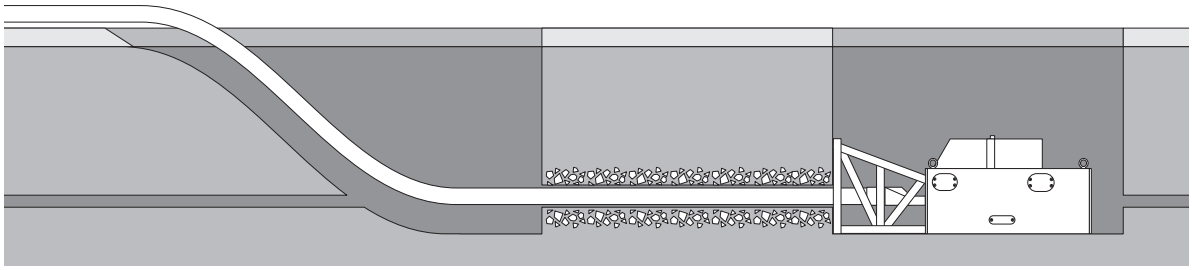

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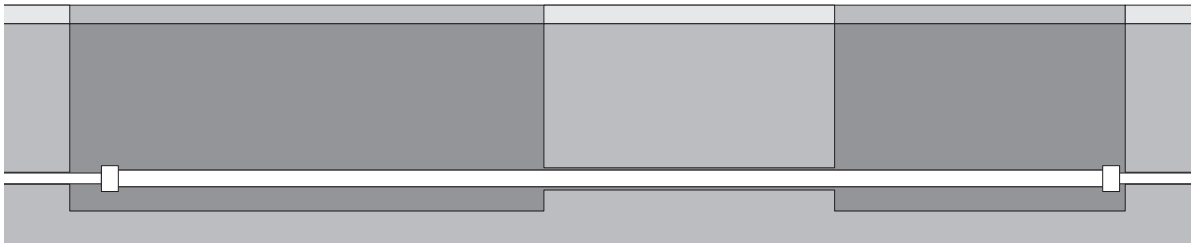
8. Thread one rod onto rod in bursting unit.
9. Remove rod makeup device.
10. Push bursting unit back slightly to remove pulling brace.
11. Move burster back in pit and position extension frame between between pipe burster and existing pipe.

IMPORTANT: Ensure extension frame is level and centered. Pull bursting unit forward until it is firmly against extension frame.

12. Put bursting unit in pull mode and pull towing system into extension frame.
13. Remove extension frame.
14. Disconnect and remove towing system.
15. Remove bursting unit from pit.
16. Connect both ends of new pipe to existing pipe to complete job.



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Systems and Equipment

Chapter Contents

Bursting String 52

- Pilot Rods 52
- Bursting Heads 53
- Towing Heads 54

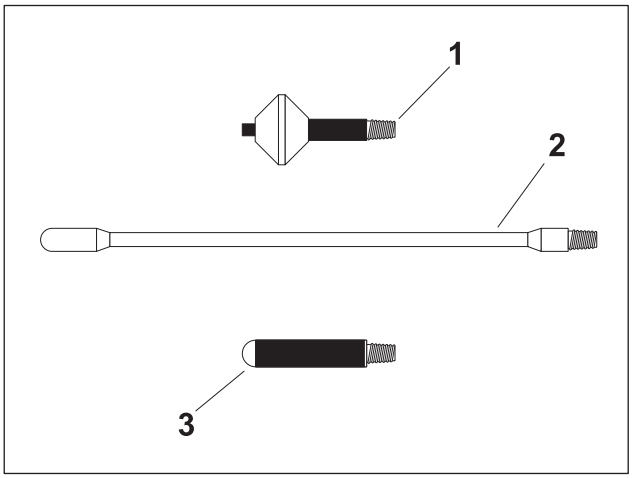
Extension Frame 55

Accessory Kit 55

Bursting String

Pilot Rods

Type		Uses
1.	fiber pilot rod	used in pipes with considerable joint misalignment
2.	flexible pilot rod	used in pipes with curves; also used in failing pipes
3.	standard pilot rod	used in pipes without joint misalignment



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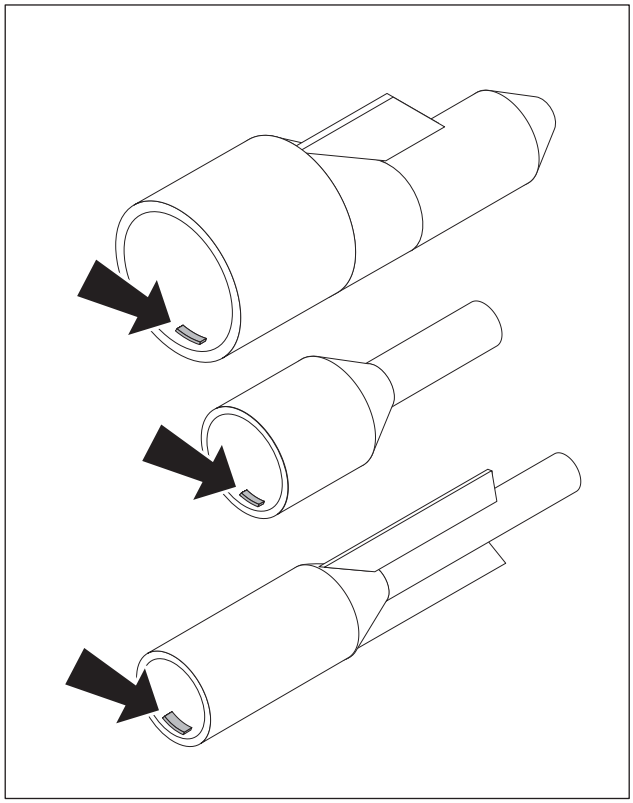
Bursting Heads

Identification

IMPORTANT: Ensure identification numbers on stop rod system and bursting head match.

Stop rods and bursting heads are each marked with an identification number. The length of the stop rod and chain is optimized for each bursting head. Always use matched components to prevent shackle and new pipe damage during installation.



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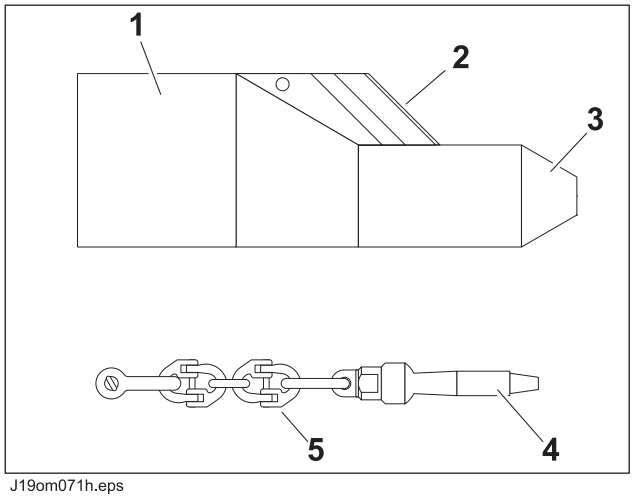
Components

IMPORTANT: Standard cutting head is shown.



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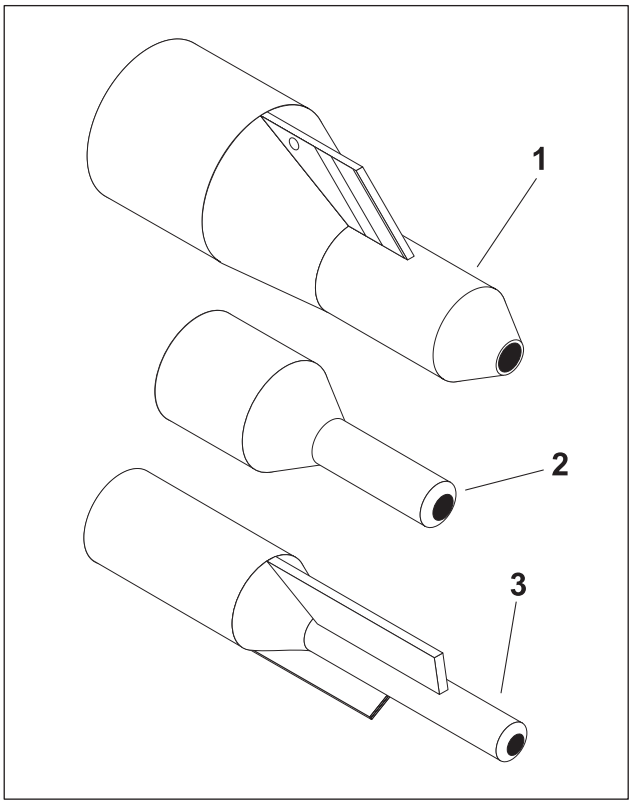
Component		Description
1.	rear of bursting head	fits OD of new pipe being installed
2.	knife	cuts existing pipe
3.	front of bursting head	fits inside existing pipe
4.	stop rod	connects rods in existing pipe to towing head
5.	d-link and chain on stop rod	attaches new pipe to stop rod system

Types and Uses

Type		Uses
1.	standard cutting head	ductile iron, steel, cast iron, reinforced concrete
2.	standard cracking head	concrete, clay, fragile pipe
3.	standard plastic PVC/PE head	plastic PVC, PE



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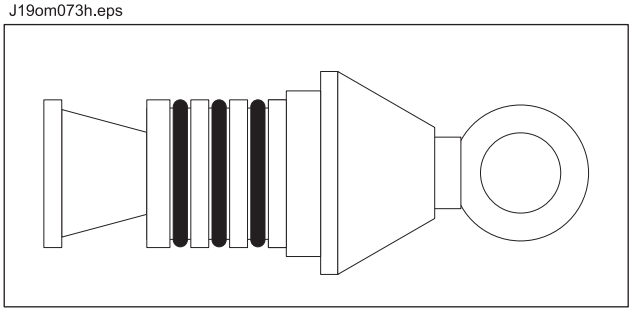
Towing Heads

IMPORTANT: Ensure towing head is sized to match new pipe.

Standard towing head: attaches to new PE pipe allowing it to be pulled through existing pipe after bursting.



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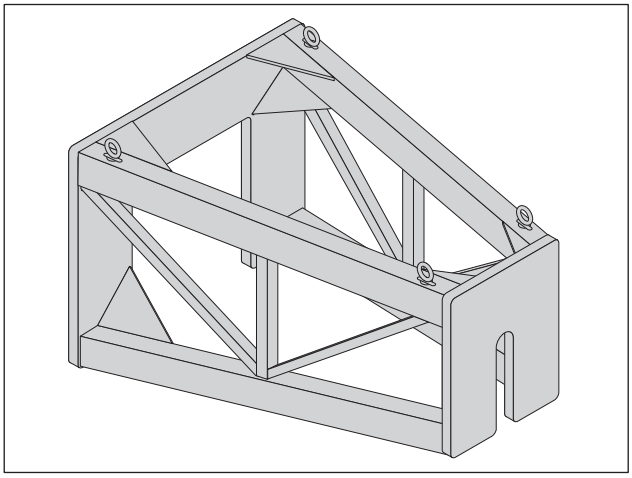
Extension Frame

The extension frame allows room to remove the towing assembly from the new pipe after it enters the bursting unit pit.



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Accessory Kit

- 7' chain set (for power unit, bursting unit)
- 3' chain set (for smaller items)
- grease gun and grease cartridges
- ground rod
- hand tools
- slide hammers
- remote control module
- remote emergency stop modules
- rod makeup device

Complete the Job

Chapter Contents

Stow Components 58

Restore Jobsite 58

Stow Components

1. Install all covers.
2. Load components onto trailer.
3. Secure all components on trailer.

Restore Jobsite

Fill in entry and bursting pits.

Service

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Service Precautions 60

Recommended Lubricants/Service Key 62

Each Use 64

10 Hour 66

50 Hour 69

200 Hour 73

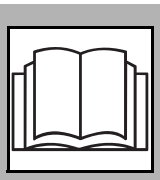
250 Hour 75

400 Hour 74

1000 Hour 76

As Needed 77

Service Precautions



WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

NOTICES:

- Unless otherwise instructed, all service should be performed with engine off.
- Refer to engine manufacturer's manual for engine maintenance instructions.

Welding Precaution

NOTICE: Welding can damage electronics.

- Disconnect battery to prevent damage to battery. Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.
- Connect welder ground clamp close to welding point and make sure no electronic components are in the ground path.
- Always disconnect the Engine Control Unit ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.

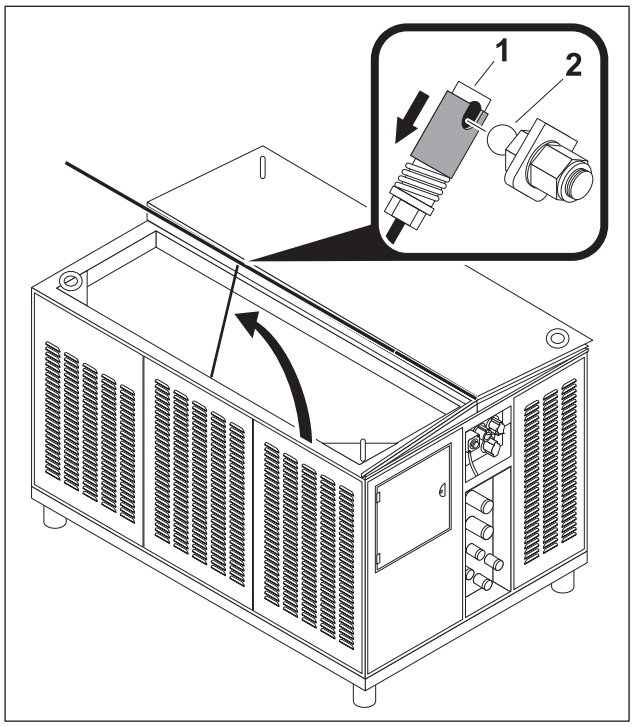
Washing Precaution

NOTICE: Water can damage electronics. When cleaning equipment, do not spray electrical components with water.

Opening/Closing Power Unit Hood

To open

1. Remove pins.
2. Lift hood.
3. Engage prop rod (2) into holder (1) as shown.



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To close

1. Disengage prop rod from holder.
2. Stow prop rod.
3. Carefully close hood.
4. Install pins.

Recommended Lubricants/Service Key

Item	Description
DEO	Diesel engine oil meeting or exceeding CD per the API service classification or E3 per the European Automobile Manufacturer's Association (ACEA) and SAE viscosity recommended by engine manufacturer
MPG	Multipurpose grease meeting ASTM D217 and NLGI 5
THF	Tractor hydraulic fluid, similar to Phillips 66 HG, Mobilfluid 423, Chevron Tractor Hydraulic Fluid, Texaco TDH Oil, Shell Tellus, or equivalent
AC	Automotive-type antifreeze/coolant meeting ASTM D3306
	Check level of fluid or lubricant
	Check condition
	Filter
	Change, replace, adjust, service or test

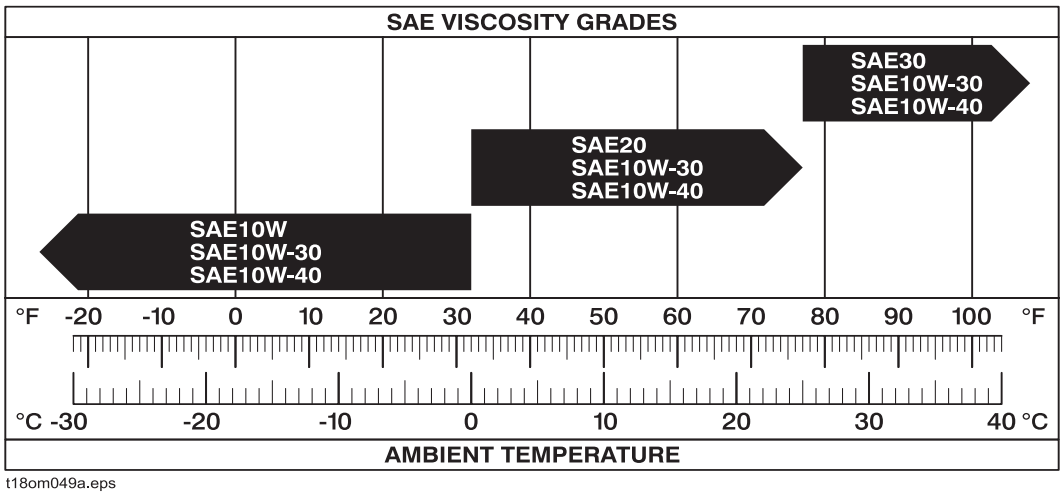
Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only recommended lubricants. Fill to capacities listed in "Fluid Capacities" on page 88.

For more information on engine lubrication and maintenance, see your Kubota® engine manual.

NOTICE:

- Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty.
- Use the "Service Record" on page 93 to record all required service to your machine.

Engine Oil Temperature Chart



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Temperature range anticipated before next oil change

Approved Coolant

Add only only automotive-type antifreeze/coolant meeting ASTM D3306.

NOTICE: Do not use diesel engine antifreeze/coolant. This will lead to engine damage or premature engine failure.

Each Use

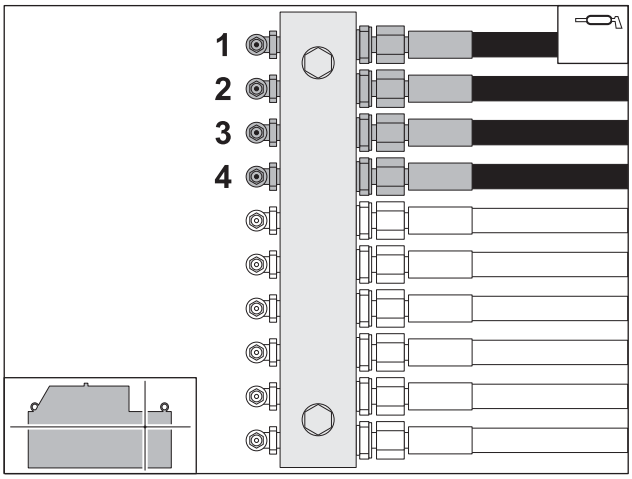
Location	Task	Notes
BURSTING UNIT	Lube front hydraulic pressure system components	MPG
	Lube rear pin bolts	MPG
	Lube rear pressure axles	MPG
	Clean jaw threads	**after** each job

Bursting Unit

Lube Front Hydraulic Pressure System Components

Lube 4 zerks with MPG each use.

IMPORTANT: Ensure front jaw is up before lubing.



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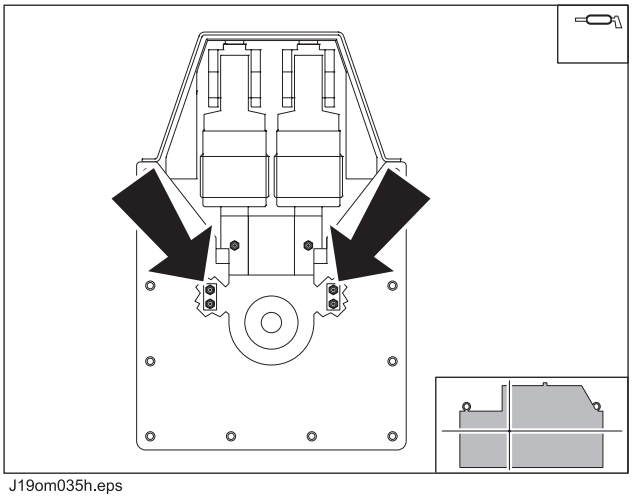
Lube Rear Pin Bolts

Lube 2 zerks with MPG each use.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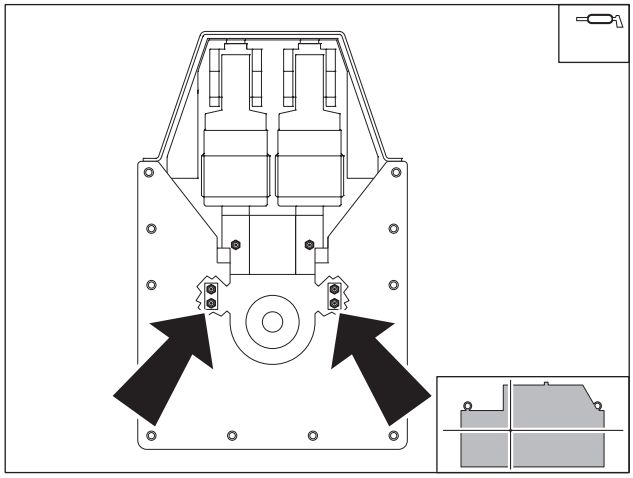
Lube Rear Pressure Axles

Lube 2 zerks with MPG each use.

IMPORTANT: Ensure rear jaw is up before lubing.



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Clean Jaw Threads

Clean jaw threads with high-pressure water after each job.

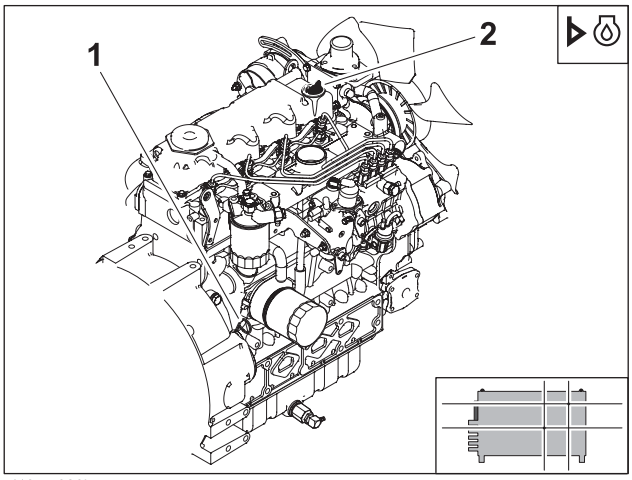
10 Hour

Location	Task	Notes
POWER UNIT	Check engine oil level	
	Check hydraulic fluid level	
	Check coolant level	
	Check hydraulic hoses and fittings	

Power Unit

Check Engine Oil Level

Check engine oil at dipstick (1) before operation and every 10 hours thereafter. Check with unit on level surface and at least 15 minutes after stopping engine. Add DEO at fill (2) as necessary to keep oil level at highest line on dipstick.



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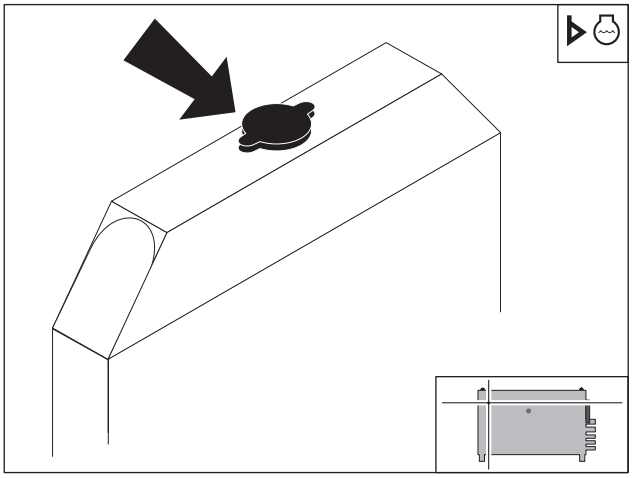
Check Engine Coolant Level

Check coolant level, with engine cool, every 10 hours. Maintain coolant level at 1" (25 mm) below bottom of radiator cap. If low, add approved coolant.

IMPORTANT: See "Approved Coolant" on page 63 for information on approved coolants.



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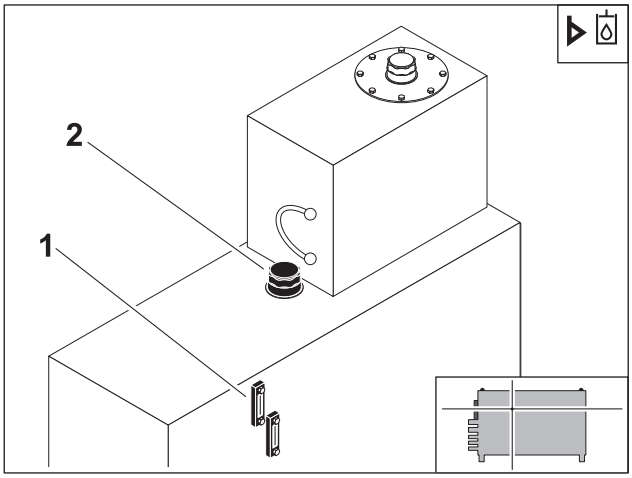
Check Hydraulic Fluid Level

Check hydraulic fluid level every 10 hours. Maintain fluid level at halfway point on upper sight glass (1), when engine is off and fluid is cool. Add THF at hydraulic fluid fill (2).



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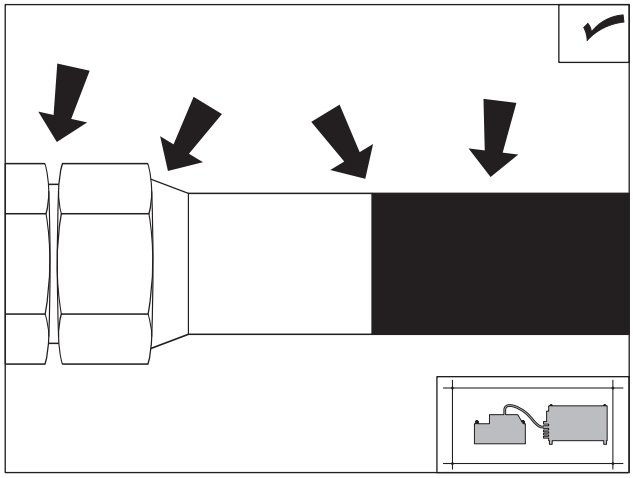
Check Hydraulic Hoses

Check hydraulic hoses for leaks every 10 hours.



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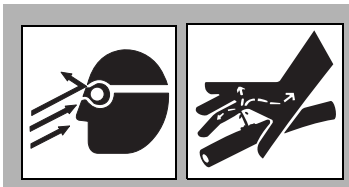


WARNING Pressurized fluid or air could pierce skin and cause injury or death. Stay away.

NOTICE: Escaping pressurized fluid can cause injury or pierce skin and poison.

- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure. Lower, block, or support any raised component with a hoist. Cover connection with heavy cloth and loosen connector nut slightly to relieve residual pressure. Catch all fluid in a container.
- Before using system, check that all connections are tight and all lines are undamaged.
- Fluid leaks can be hard to detect. Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

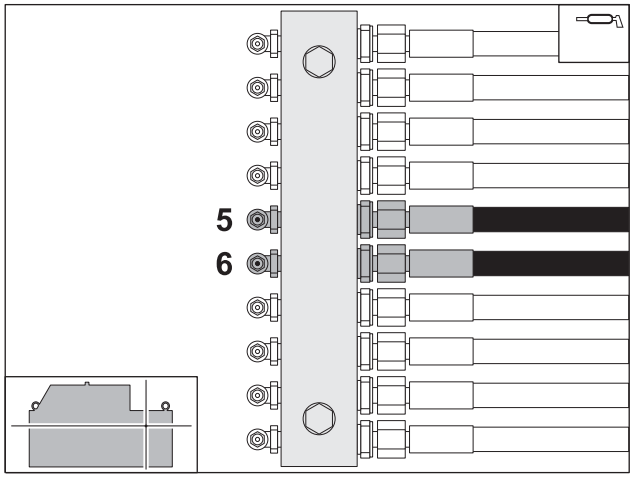
50 Hour

Location	Task	Notes
BURSTING UNIT	Lube large hydraulic cylinders - front	MPG
	Lube small front cylinders	MPG
	Lube carriage rollers	MPG
	Lube large hydraulic cylinders - rear	MPG
	Lube small front cylinders - lower area	MPG
POWER UNIT	Check radiator	
	Change engine oil and filter	Initial service

Bursting Unit

Lube Large Hydraulic Cylinders - Front

Lube 2 zerks with MPG every 50 hours.



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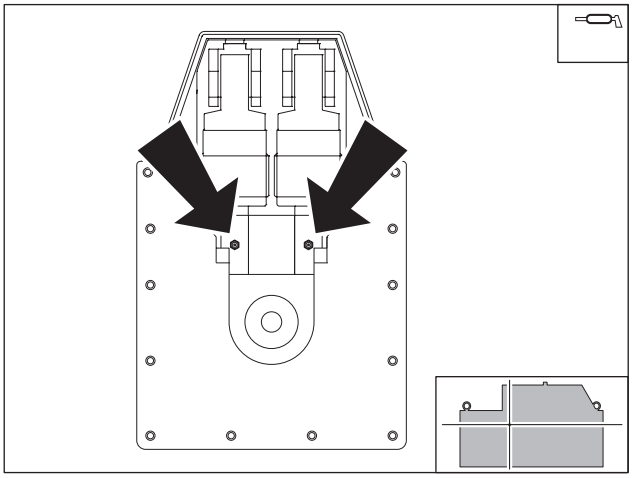
Lube Small Front Cylinders

Lube 2 zerks with MPG every 50 hours.



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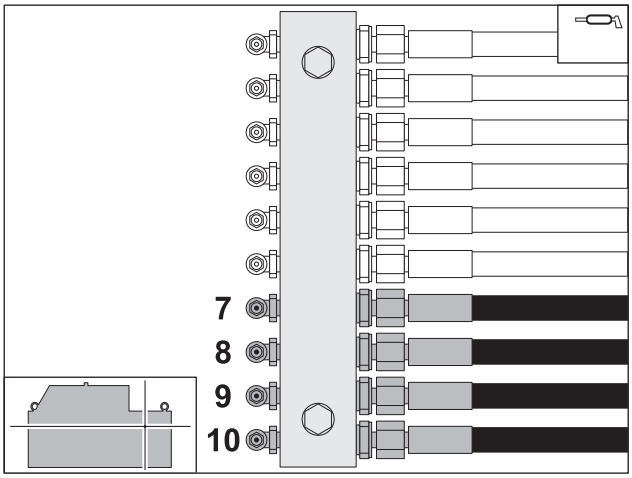
Lube 4 zerks with MPG every 50 hours.



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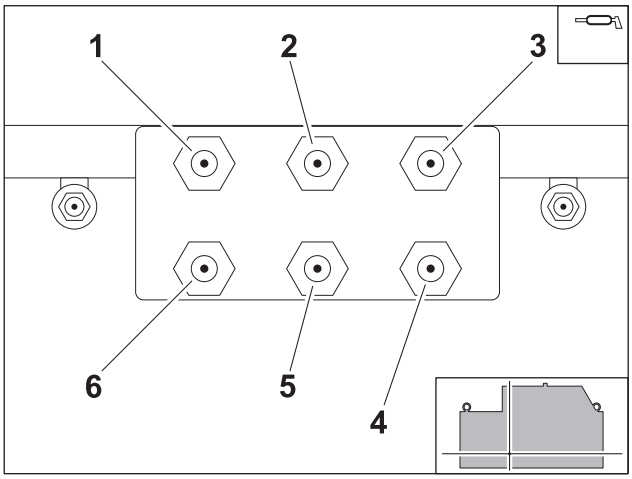
Lube Carriage Rollers

Lube 6 zerks with MPG every 50 hours.



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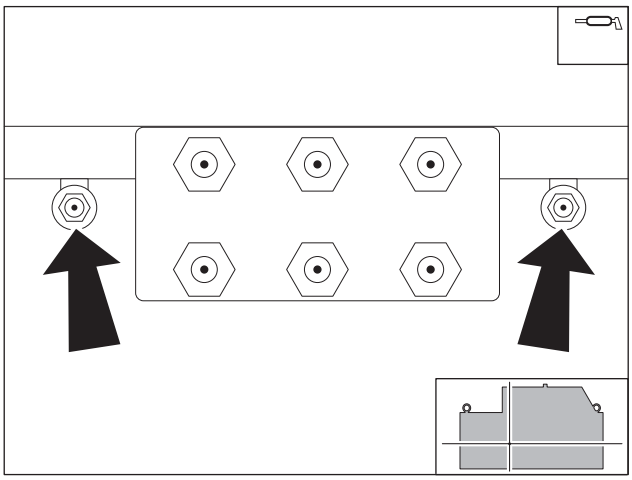
Lube Large Hydraulic Cylinders - Rear

Lube 2 zerks with MPG every 50 hours.



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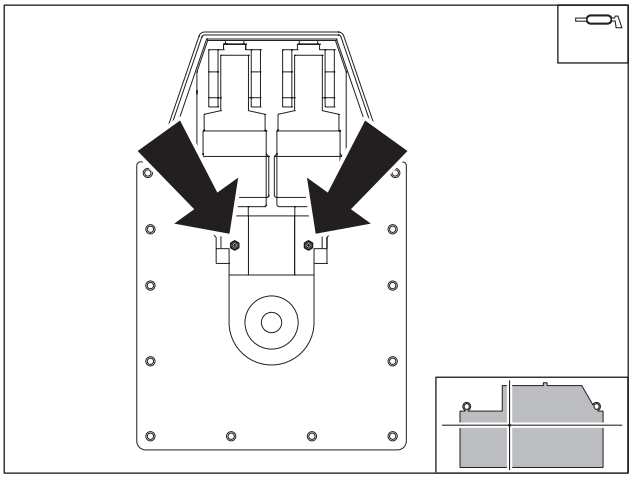
Lube Small Front Cylinders - Lower Area

Lube 2 zerks with MPG every 50 hours.



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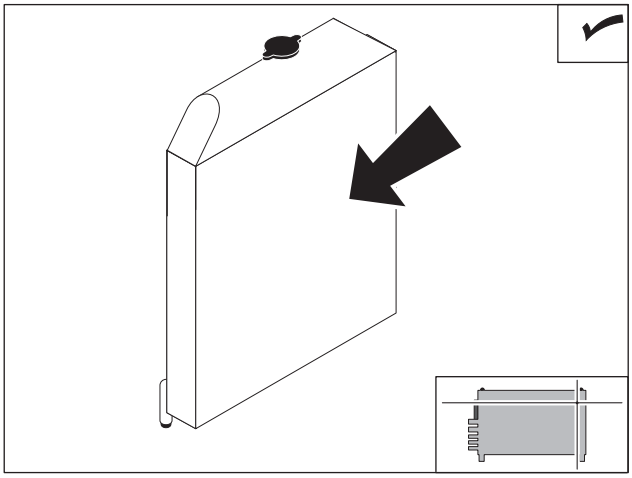
Power Unit

Check Radiator

Check radiator fins for dirt, grass, and other foreign matter every 50 hours. Check more often if operating in dusty or grassy conditions. Clean as needed.

To clean

- Clean fins with compressed air or spray wash.
- Open rear hood and spray through radiator toward engine.
- If grease and oil are present on radiator, spray with solvent and allow to soak overnight.



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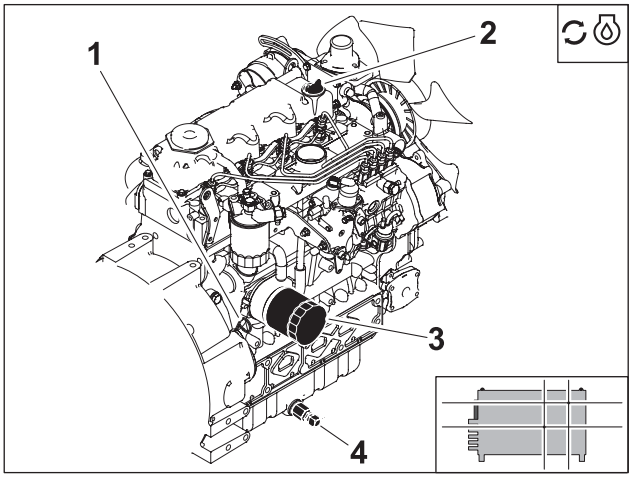
IMPORTANT: Be careful not to damage fins with high pressure air or water.

Change Engine Oil & Filter (Initial Service)

Change engine oil and filter after 50 hours. Drain oil (4), change filter (3), and add 14 qt (13 L) of DEO at fill (2).

IMPORTANT: If operating in extremely dusty conditions, change oil more frequently. Use oil specified in temperature chart found in "Recommended Lubricants/Service Key" on page 62.



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200 Hour

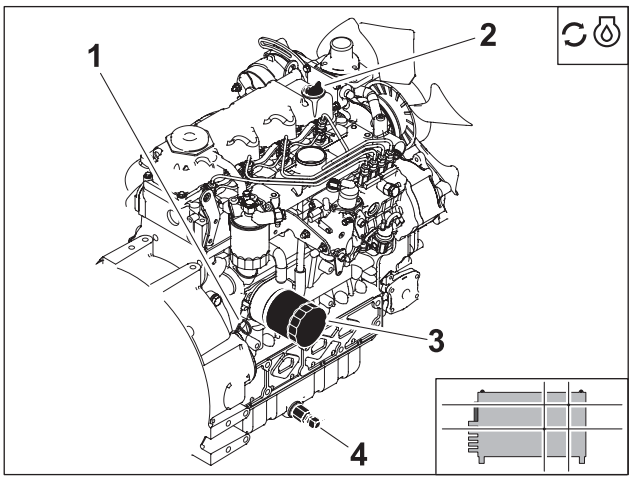
Location	Task	Notes
POWER UNIT	Change engine oil	DEO

Power Unit

Change Engine Oil

Change engine oil after 50 hours. Drain oil (4) and add 14 qt (13 L) of DEO at fill (2).

IMPORTANT: If operating in extremely dusty conditions, change oil more frequently. Use oil specified in temperature chart found in "Recommended Lubricants/Service Key" on page 62.



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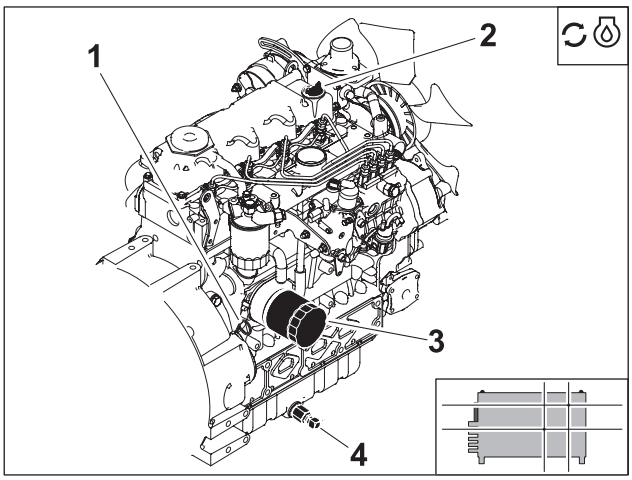
400 Hour

Location	Task	Notes
POWER UNIT	Change engine oil filter	
	Change fuel filter	

Drilling Unit

Change Engine Oil Filter

Change engine oil filter (3) every 400 hours for normal service.



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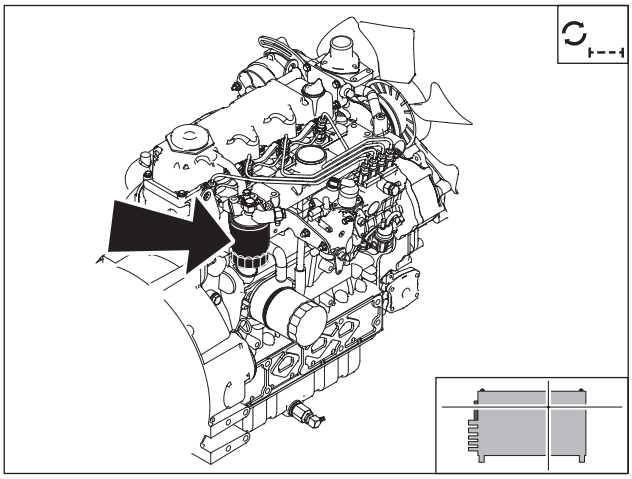
Change Fuel Filter

Replace fuel filter every 400 hours. If you refuel from cans, replace filter more often. See parts manual or contact your Ditch Witch dealer for correct replacement filter.


J19om030h.eps

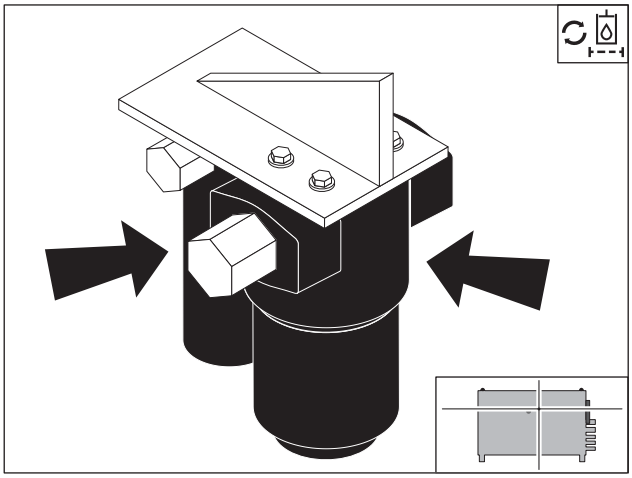
500 Hour

Location	Task	Notes
POWER UNIT	Clean hydraulic strainer	
	Change hydraulic filter	

Power Unit

Clean Hydraulic Strainer

Clean hydraulic strainer every 500 hours. Replace if damaged.



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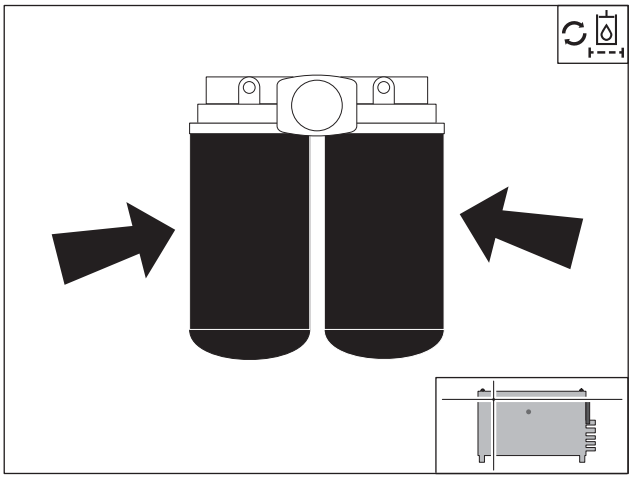
Change Hydraulic Filters

Change hydraulic filters every 500 hours.



J19om017h.eps

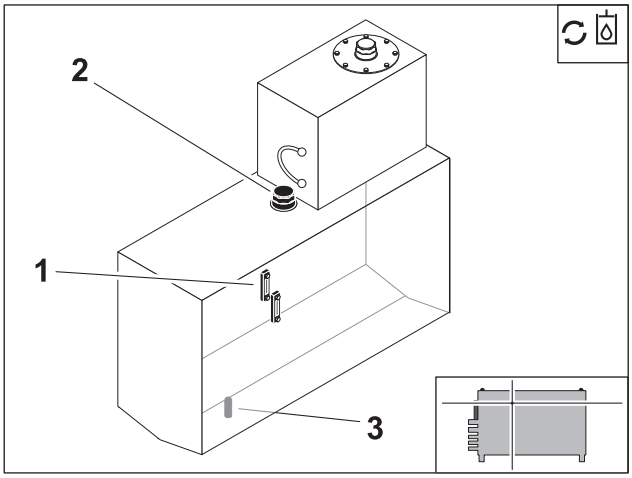
1000 Hour

Location	Task	Notes
POWER UNIT	Change hydraulic fluid	
	Change engine coolant	

Power Unit

Change Hydraulic Fluid

Change hydraulic fluid and filter every 1000 hours for normal service. Drain hydraulic fluid (3), change filter, and add THF at hydraulic fluid fill (2).



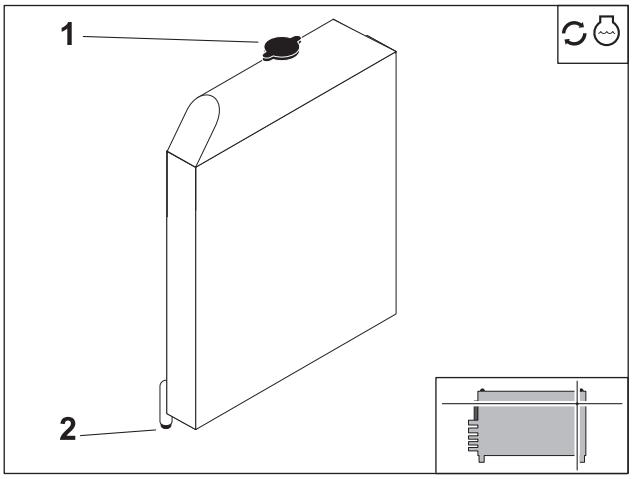
J19om021h.eps

Change Engine Coolant

Drain cooling system at drain (2) every 1000 hours. Add coolant at fill (1).

NOTICE:

- The use of non-approved coolant may lead to engine damage or premature engine failure and will void engine warranty.
- See "Approved Coolant" on page 63 for list of approved coolants.



J19om022h.eps

As Needed

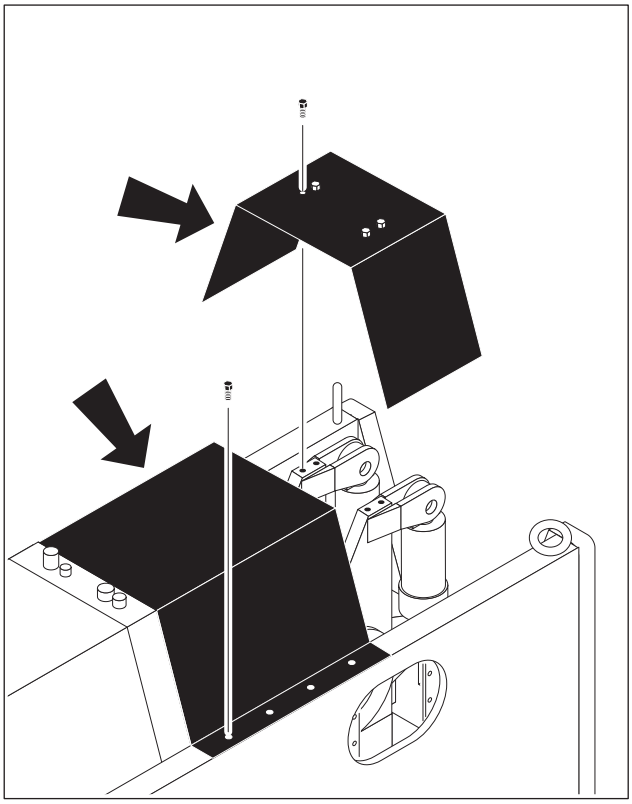
Location	Task	Notes
BURSTING UNIT	Repair jaw threads	
POWER UNIT	Change air filter	
	Adjust fan belt tension	

Bursting Unit

Repair Jaw Threads

Remove Jaws

1. Remove covers (shown).
2. Put bursting unit into manual mode and move cylinders until pin bolt hole is aligned with hole.
3. Open jaws slightly.



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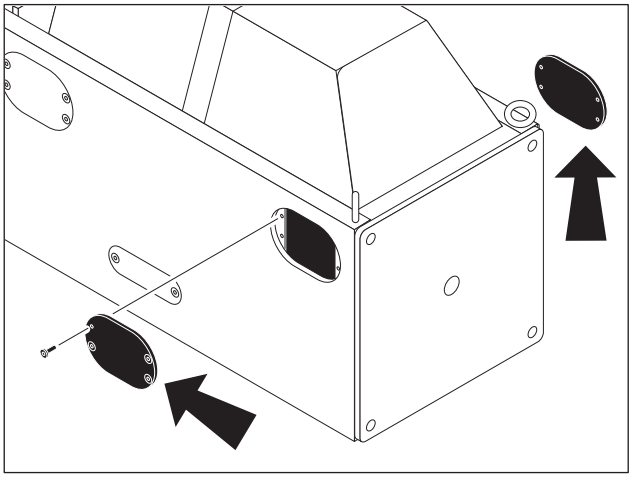
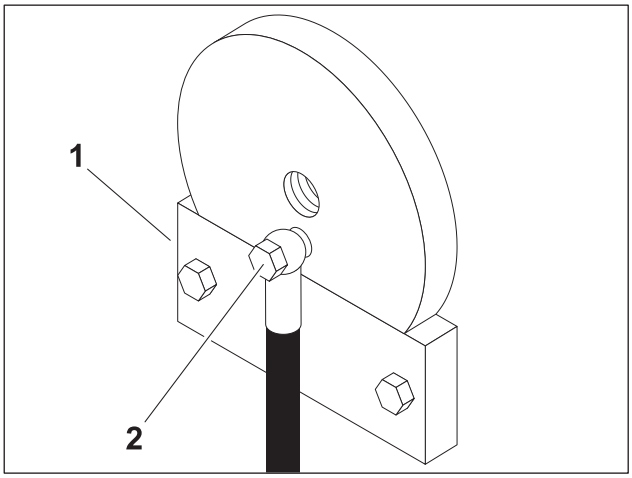
4. Remove covers (shown) on sides of bursting unit.



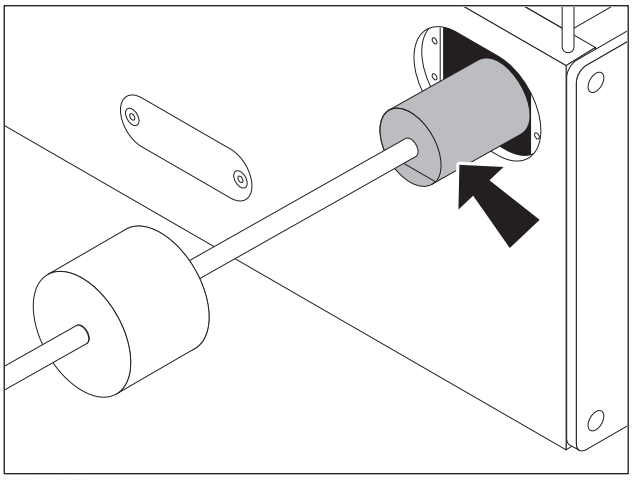
J19om041h.eps

5. Disconnect hose (2).
6. Remove support plate (1) from pin bolt.



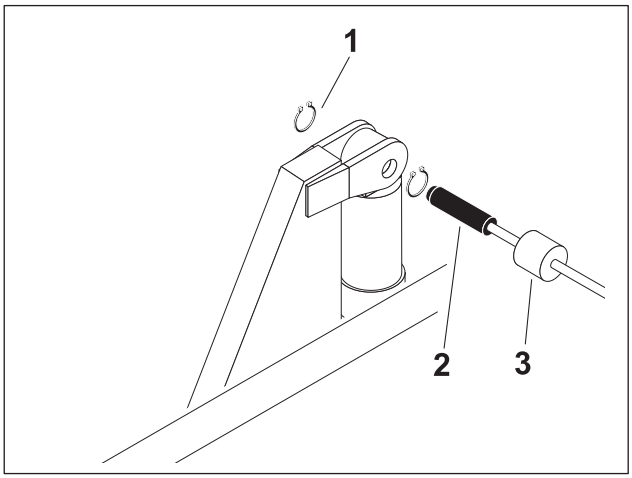
J19om042h.eps

7. Thread large slide hammer into pin bolt.
8. Pull pin bolt clear of cylinders but not all the way out, as shown.
9. Remove slide hammer.



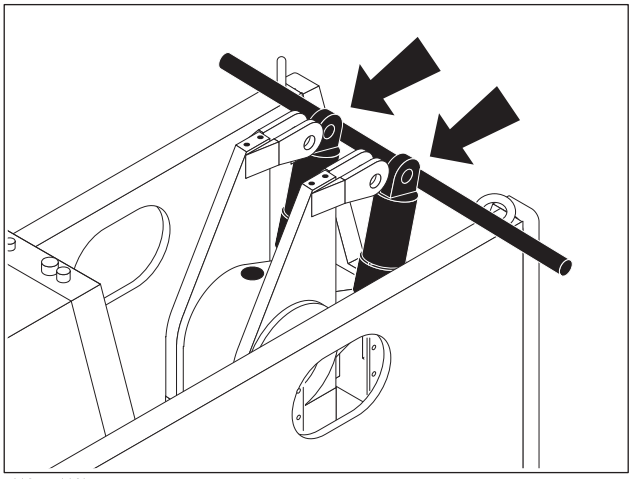
J19om043h.eps

10. Thread small slide hammer (3) into cylinder rod (2).
11. Remove snap ring (1).
12. Use slide hammer to remove cylinder rod completely.
13. Repeat for other cylinder.

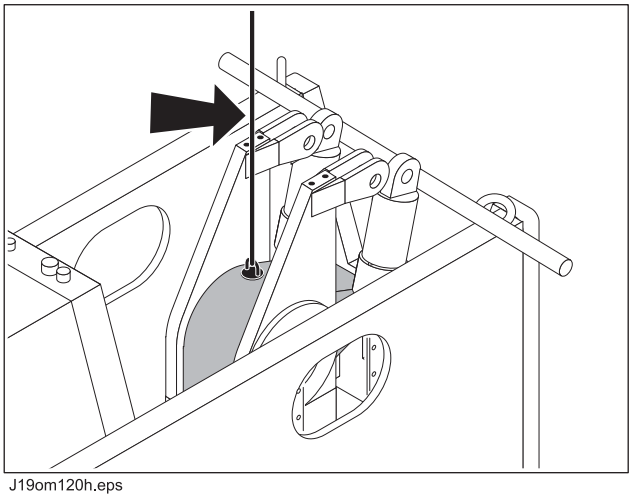


J19om046h.eps

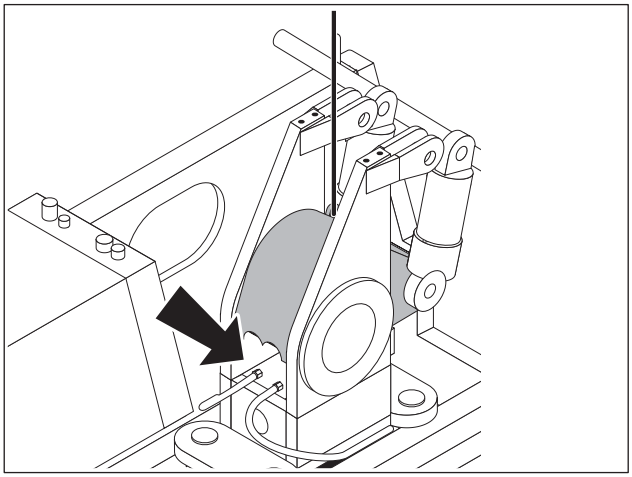
14. Support cylinders as shown.
15. Remove slide hammer.


J19om119h.eps

16. Install eye and bolt into cam.
17. Push cylinder control forward gently.
18. Attach lifting device to pin as shown.

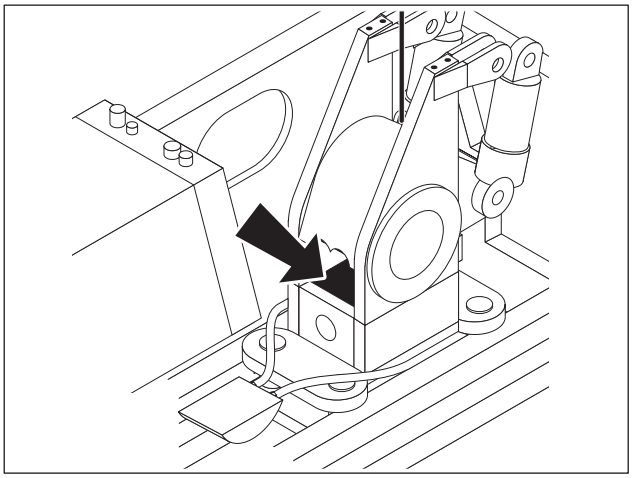

J19om120h.eps

19. Lift cam slowly until pressure axle (shown) is accessible.



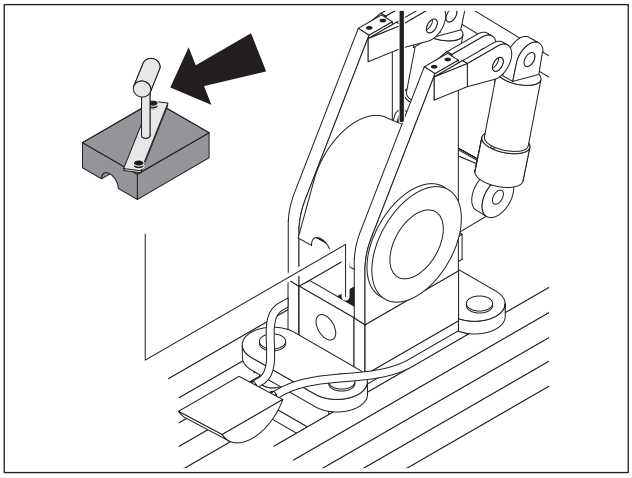
J19om121h.eps

20. Flip pressure axle clear of jaws to allow access to top jaw.



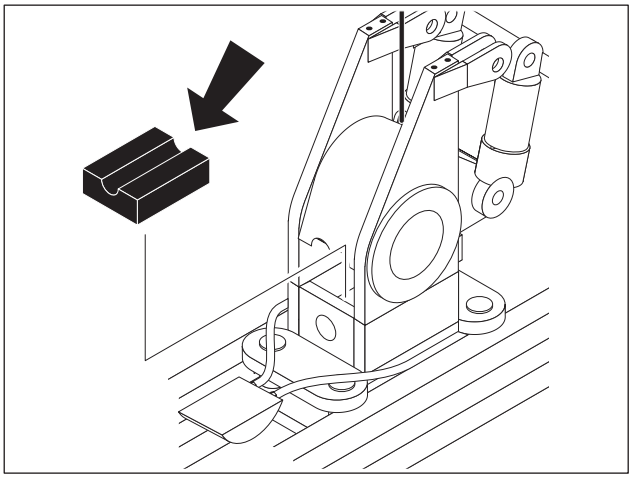
J19om0122h.eps

21. Install bolts into top jaw.
22. Engage jaw extraction tool (shown) on bolts.
23. Lift out top jaw.



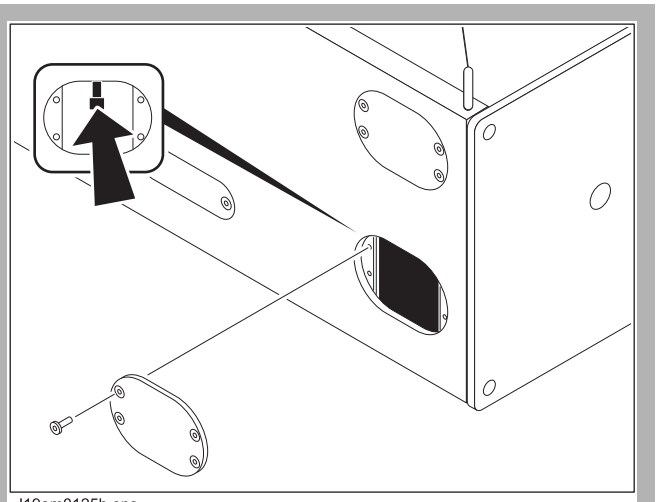
J19om0123h.eps

24. Press down on side of lower jaw (shown) and remove by hand.



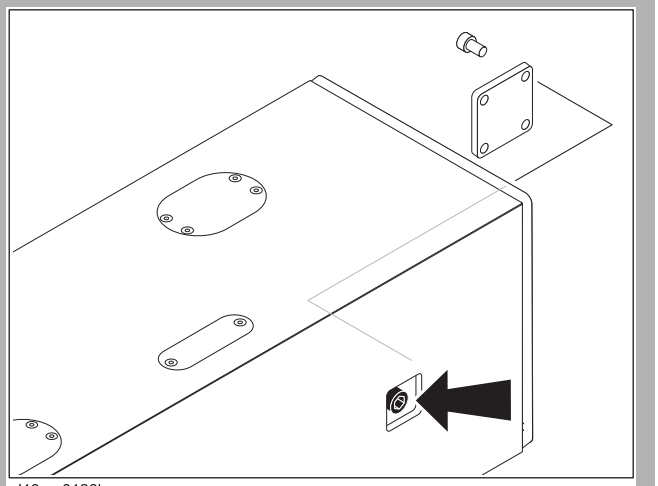
J19om0124h.eps

NOTICE: If lower rear jaw will not move, use 24-mm socket to turn bolt (shown) under jaw.



J19om0125h.eps

If lower front jaw will not move, unbolt access cover, turn unit on its side, and use 14-mm hex wrench to turn bolt (shown) under jaw.



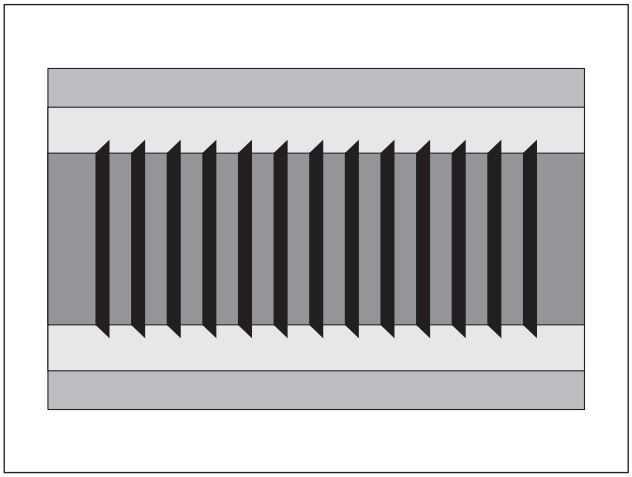
J19om0126h.eps

25. Clean area under lower jaw before reassembly.

Repair Jaw Threads

1. Use screwdriver to remove debris from threads.
2. Pressure wash threads.
3. Use grinder to repair threads as shown.

IMPORTANT: Grind only enough material from jaws to return them to the correct shape.



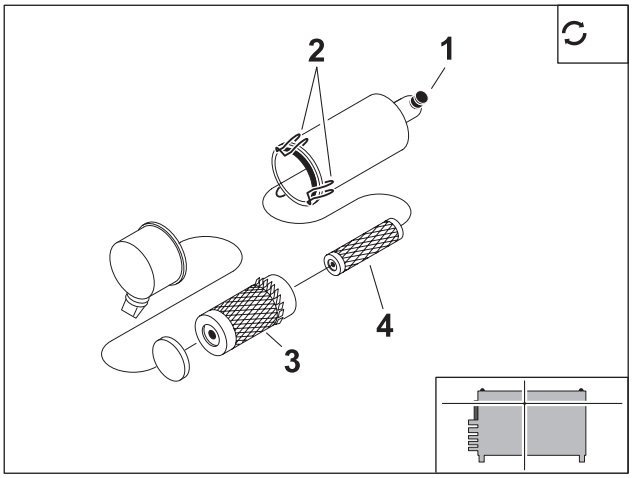
J19om050h.eps

Install Jaws

1. Install lower jaw.
2. Install upper jaw.
3. Remove jaw extraction tool and bolts.
4. Position pressure axle over upper jaw.
5. Lower cam onto pressure axle.
6. Align one cylinder with pin hole and use small slide hammer to install rod.
7. Repeat for other cylinder.
8. Install snap rings.
9. Remove slide hammer.
10. Thread large slide hammer into other side of pin bolt.
11. Use slide hammer to pull pin bolt into position.
12. Install support plate.
13. Remove slide hammer.
14. Install covers.

Power Unit

Change Air Filter



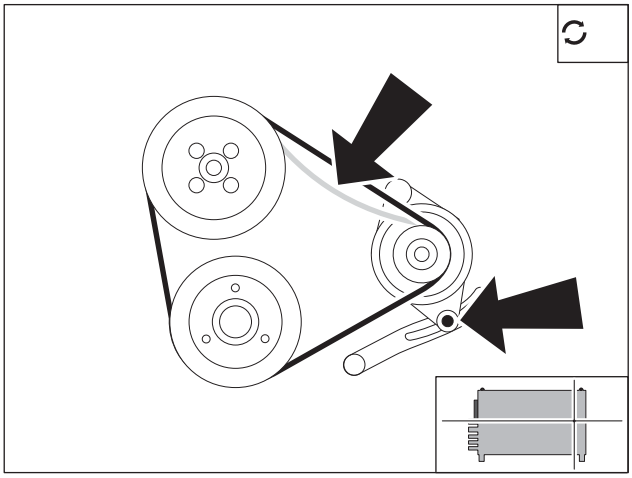
J19om019h.eps

Change air filter as needed.

To change

1. Disengage clasps (2) and remove end cup.
2. Remove primary element (3).
3. Remove secondary element (4), if dirty.
4. Wipe inside of housing and wash end cup.
5. Install new element(s).
6. Install end cup and engage clasps.
7. Reset air filter service indicator (1).

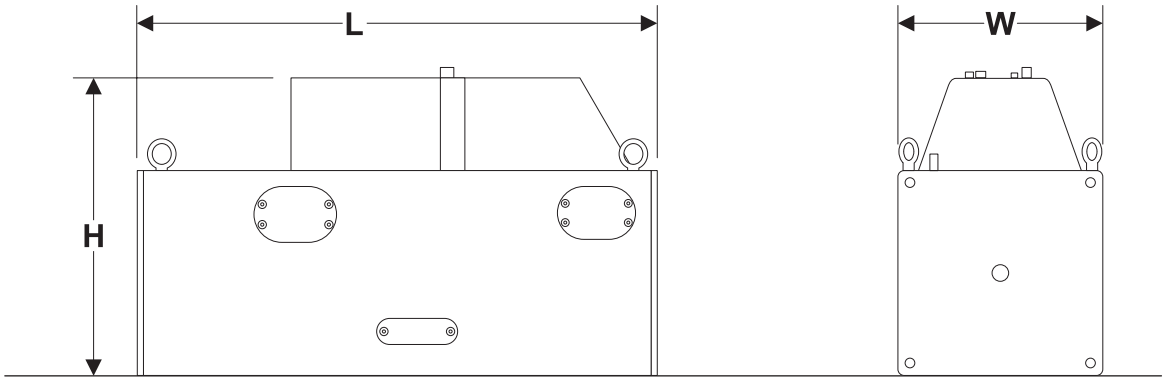
Adjust Fan Belt Tension


J19om028h.eps

1. Turn off engine and remove key.
2. Apply moderate thumb pressure to belt between pulleys, as shown.
3. Belt is properly tensioned when deflection is about 1/4-3/8" (7-9 mm).
4. If needed, loosen alternator bolts (shown) and pull alternator out until correct tension is reached.
5. Tighten alternator bolts.

Specifications

Bursting Unit



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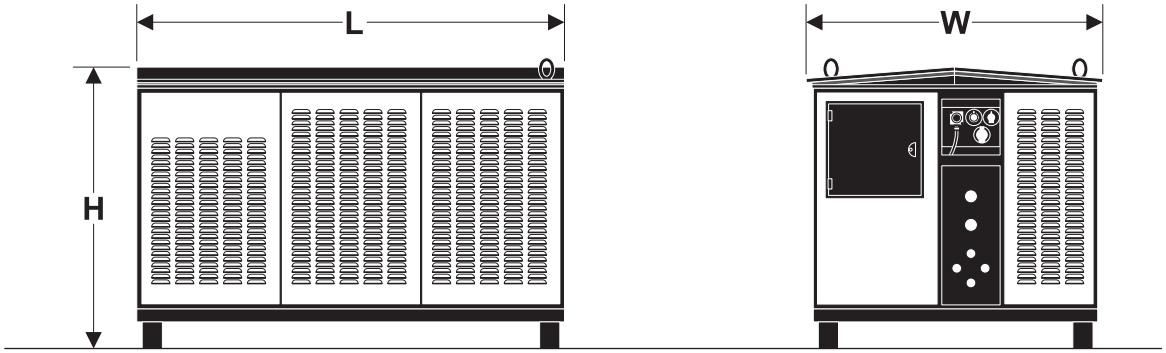
Dimensions	U.S.	Metric
L, length	71 in	1.8 m
W, width	27.6 in	700 mm
H, height	43.3 in	1.1 m
Weight, mass	7050 lb	3200 kg

Operational	U.S.	Metric
Pullback force	187, 400 lb	85 t

Rod	U.S.	Metric
Length	39.4 in	1 m
Diameter	1.97 in	50 mm
Weight, mass	33 lb	15 kg

Power Unit



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Dimensions	U.S.	Metric
L, length	83 in	2.1 m
W, width	51.2 in	1.3 m
H, height	49.2 in	1.25 m
Weight, mass	3200 lb	1450 kg

Power		U.S.	Metric
Engine: Kubota V3300E			
Fuel: diesel			
Cooling medium: liquid			
Injection: indirect			
Aspiration: natural			
Cylinders: 4			
Displacement		202 in^3	3.3 L
Bore		3.86 in	98 mm
Stroke		4.33 in	110 mm
Power			
	manufacturer's gross power rating (per SAE J1995)	63 hp	47 kW
	manufacturer's net power rating (per SAE J1349)	59 hp	44 kW
	rated speed	2200 rpm	2200 rpm

Hydraulic System		U.S.	Metric
Main pump			
	Maximum flow	42 gpm	161 L/min
	Maximum pressure	3600 psi	250 bar
Jaw pump			
	Maximum flow	17 gpm	64 L/min
	Maximum pressure	3600 psi	250 bar

Fluid Capacities	U.S.	Metric
Fuel tank	10.6 gal	40 L
Hydraulic reservoir	53 gal	200 L
Engine oil, including filter	14 qt	13 L
Engine cooling sytem	5.4 gal	5.1 L

Battery
12V, negative ground, SAE cold crank rating @ 0°F (-18°C), 670 amps.

Noise Levels
Exterior 100 dBA sound power per ISO 6395
Operator 79 dBA sound pressure per ISO 6394

Specifications are called out according to SAE recommended practices where indicated. Specifications are general and subject to change without notice. If exact measurements are required, equipment should be weighed and measured. Due to selected options, delivered equipment may not necessarily match that shown.

Support

Procedure

Notify your dealer immediately of any malfunction or failure of Ditch Witch equipment.

Always give model, serial number, and approximate date of your equipment purchase. This information should be recorded and placed on file by the owner at the time of purchase.

Return damaged parts to dealer for inspection and warranty consideration if in warranty time frame.

Order genuine Ditch Witch replacement or repair parts from your authorized Ditch Witch dealer. Use of another manufacturer's parts may void warranty consideration.

Resources

Publications

Contact your Ditch Witch dealer for publications and videos covering safety, operation, service, and repair of your equipment.

Ditch Witch Training

For information about on-site, individualized training, contact your Ditch Witch dealer.

Warranty

Ditch Witch Equipment and Replacement Parts Limited Warranty Policy

Subject to the limitation and exclusions herein, free replacement parts will be provided at any authorized Ditch Witch dealership for any Ditch Witch equipment or parts manufactured by The Charles Machine Works, Inc. (CMW) that fail due to a defect in material or workmanship within one (1) year of first commercial use (Exception: 2 years for all SK attachments). Free labor will be provided at any authorized Ditch Witch dealership for installation of parts under this warranty during the first year following "initial commercial" use of the serial-numbered Ditch Witch equipment on which it is installed. The customer is responsible for transporting their equipment to an authorized Ditch Witch dealership for all warranty work.

Exclusions from Product Warranty

- All incidental or consequential damages.
- All defects, damages, or injuries caused by misuse, abuse, improper installation, alteration, neglect, or uses other than those for which products were intended.
- All defects, damages, or injuries caused by improper training, operation, or servicing of products in a manner inconsistent with manufacturer's recommendations.
- All engines and engine accessories (these are covered by original manufacturer's warranty).
- Tires, belts, and other parts which may be subject to another manufacturer's warranty (such warranty will be available to purchaser).
- ALL IMPLIED WARRANTIES NOT EXPRESSLY STATED HEREIN, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY.

IF THE PRODUCTS ARE PURCHASED FOR COMMERCIAL PURPOSES, AS DEFINED BY THE UNIFORM COMMERCIAL CODE, THEN THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF AND THERE ARE NO IMPLIED WARRANTIES OF ANY KIND WHICH EXTEND TO A COMMERCIAL BUYER. ALL OTHER PROVISIONS OF THIS LIMITED WARRANTY APPLY INCLUDING THE DUTIES IMPOSED.

Ditch Witch products have been tested to deliver acceptable performance in most conditions. This does not imply they will deliver acceptable performance in all conditions. Therefore, to assure suitability, products should be operated under anticipated working conditions prior to purchase.

Defects will be determined by an inspection within thirty (30) days of the date of failure of the product or part by CMW or its authorized dealer. CMW will provide the location of its inspection facilities or its nearest authorized dealer upon inquiry. CMW reserves the right to supply remanufactured replacements parts under this warranty as it deems appropriate.

Extended warranties are available upon request from your local Ditch Witch dealer or CMW.

Some states do not allow exclusion or limitation of incidental or consequential damages, so above limitation of exclusion may not apply. Further, some states do not allow exclusion of or limitation of how long an implied warranty lasts, so the above limitation may not apply. This limited warranty gives product owner specific legal rights and the product owner may also have other rights which vary from state to state.

For information regarding this limited warranty, contact CMW's Product Support department, P.O. Box 66, Perry, OK 73077-0066, or contact your local Ditch Witch dealer.

First version: 1/91; Latest version: 7/05

A Note To Ditch Witch Equipment Owners:

If your equipment was purchased through a Ditch Witch dealer, there is no need to read further.

However, if you purchased from any other source, please fill out the form on the reverse side and return it to us.

This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

(Please Fold Along This Line And Seal At Bottom With Tape)

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO 23 PERRY OKLAHOMA

POSTAGE WILL BE PAID BY

The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989

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Ditch Witch® Registration Card

Please Type or Print All Information

Purchaser's Company Name

Attention

Street Address or P.O. Box

City County

State Zip Nation

( )

Phone Number With Area Code

Model Serial Number

Attachments/Accessories Serial Numbers

Attachments/Accessories Serial Numbers

Attachments/Accessories Serial Numbers

Name of Ditch Witch Dealership

Your Signature

Ditch Witch® Registration Card

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Name of Ditch Witch Dealership

Your Signature

Service Record

Service Performed	Date	Hours

Service Performed	Date	Hours